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VOLUME 15

IN THE SUPERIOR COURT,

State of California, County of Sacramento.

OCTOBER SESSION, 1881.

HON. JACKSON TEMPLE, - - - - - - - PRESIDING JUDGE.

WINFIELD J. DAVIS, OFFICIAL REPORTER.

SAMUEL OSBOURNE AND WILLIAM M. CUTTER, REPORTERS.

The People of the State of California,
vs.
The Gold Run Ditch and Mining Co.

COUNSEL:

For Plaintiff,

HON. A. L. HART, Attorney General, GEORGE CADWALADER, ISAAC S. BELCHER, A. L. RHODES, RICHARD BAYNE.

For Defendant,

J. K. BYRNE, W. C. BELCHER, S. M. WILSON, W. T. WALLACE, A. B. DIBBLE, A. P. CATLIN.

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In the Superior Court of the State of California in and for the County of Sacramento.

The People of the State of California
-vs-
The Gold Run Ditch and Mining Company

Wednesday Dec. 7th 1881 Afternoon Session

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Reported by
Winfield J. Davis
Official Reporter.

Afternoon Session

Testimony of John Shafer

Resumed.

Mr Caduladar What part of that island was in cultivation in 1878?

A. In 1878 there was very little. That was right after the flood of 1878

2. Well 1877 then?

A. Well it was principally all six

2. Principally all of it- How much would all be? How many acres?

A. Well, taking out sloughs, levees, etc., would leave 7,000 acres - there was pretty near 8,000 acres in the island

2. Were you frequently on the river between your place and Sacramento?

A. Well, yes, more or less

2 How is the shoaling there in the last five years, compared with the previous five, or the last ten with the previous ten, at your place?

A. It has been a continual shoaling from year to year, about 1871 or '72 is when it first attracted my notice, that it was shoaling very materially. Since then it has been gradually shoaling all the time, and every year more

2. What kind of debris is left on your land, from the flood of 1878, if any?

A. Well, the flood of 1878 washed more sand than any flood previous to that - coarser material.

2. How did the levees that you built after 1878 compare with those that you built previously.

A. Well, they were some considerably higher than the old levee, mostly, some portions where the levee did not break in 1878, was not raised some few places

Cross-Examination of John Shafer

Mr Pattin By what slough is Bannon Island bounded on the north?

A. On the north by Old River, the Old River is the north side of Bannon Island

Q. Old River on the north?

A. Yes sir

Q. By what slough on the east? A Jackson Slough, a slough that makes from the Sacramento to the San Joaquin

Q. By what slough on the south? A. What is

known by Seven-Mile Slough

2. State at what point does Cache Slough come in with reference to ~~Beaver~~ Brannon Island?

A. It comes in north, a little east, probably of north, Cache Slough puts in just above the mouth of the two rivers, Steamboat Slough and the Old River, above the junction of the two

2. The north-western end of the island is immediately opposite the mouth of Cache Slough, is it not?

A. Pretty much so, yes sir. I say that Cache Slough is a little east of north, I think

2. A little west of north?

A. No sir, east.

2. Cache Slough comes in from the west, does it not?

A. It is east of north - it is almost immediately north, but, if anything

east of north

2. What effect has the waters of Cache Slough at flood periods have on Brannon Island?

A. Well, it has the effect of shutting off, as it were, the Sacramento River, the body of water that comes off of Cache Slough, the Yolo Basin, is much larger than the water that comes down the river. It has a tendency to dam ~~up~~ up the Sacramento River

2. Well my question was, what effect has it upon Brannon Island?

A. It runs immediately across it

2. Did it do so in the big flood of 1852 and '53?

A. Yes, sir

2. Did it do so in the big flood of 1861 and '62?

A. Well, to ascertain extent 1861 and 1862 was not much flow either way. It was a calm

sea. in there, the San Joaquin was high in proportion to the Sacramento River

Q. Well it went all over Brannon Island?

A. Yes sir

Q. Covered everything I suppose in sight, except the Montezuma Hills?

A. I presume, higher than anything we have ever had since. I do not know but it was. I was not there at the highest water

Q. You were not there at the highest water?

A. No. sir, I was not

Q. But from the evidences you afterwards observed, you could see that it had been over Brannon Island, and all the islands in that vicinity

A Yes sir

Q. How was it in 1878? How did Cache Slough effect Brannon Island then?

A Well it ran right across

the Sacramento, and across Brannon Island

2. At what years have there been high floods, when Brannon Island was overflowed, besides 1852 and 3, and 1861 and '62, and 1877 and '78, since your residence there? A. If you allow me to refer to dates, I can tell you

2. Certainly. A. (referring) In 1852 and '53, and in 1861 and '62, and in 1866 and '67, and in '67 and '68, and in '68 and '69, and then in 1871 and '72. In 1876, we then had levees - our levees did not break, but there was quite high water, The Grand Island, levee, immediately opposite me, this levee did break and a great many of the other islands

2. The Brannon Island levee stood then in 1866?

A. Yes sir. In 1878, that-

year our levees broke.

2. And again in 1880-81?

A. In 1880 our levees did not break

2. Well I mean in the winter of 1880-81- How was it in 1881? A. Pretty near all destroyed

2. Pretty ~~near~~ all broke?

A. Yes sir

2. Badly broken. How high were the natural banks of Brannon Island, on the Sacramento River in 1875-7, when you first settled there?

A. Well, really, our banks are comparatively low, not more than, say 5 feet, hardly that-

2. Was it not much less than 5 feet in many places?

A. Well, in extreme high tide there were not that

2. Did not the tides overflow some portions of the island? A. The back land did

2. The back land did?

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A. The back land would overflow what they called the tule land, with the tides

Q. The back land, what you called the tule land, overflowed with the tides?

A. Yes sir. That is, in the sloughs

Q. The tides would enter where the sloughs were, and overflow the tule, or the low part? A. Yes sir

Q. It did not overflow the banks, the high banks on the immediate border of the river? A. No sir

Q. Now as you found it in 1852 and 53, what portion of this land was tule land, or covered with grass of the nature of tule?

A. Well, the greatest portion of it, the larger portion was tule and grass land

Q. Tule and water grass land, by far the larger portion? A. Yes sir

Q. Well would it cover 8/10 or 9/10 of that character of land, covered with tules

A. It is hard for me to tell, I do not know that I could answer that very correctly. The bank land is what we cultivated, and it varied very materially, some places it would be not very wide, and other places considerably wider

Q. How ~~d~~ wide was it the narrowest place?

A. Some places it would not be more than five or six rods wide, ten rods say, and other places it would be 25, 30, or 40

Q. In 1852, 53, 54, and along there, when you first settled, how much land did you cultivate - how many acres to cabbages, and vegetables of different kinds?

A. Well ~~of~~ we had quite a long front there - I do not know, we might have

cultivated 40 acres

2. How much front of the river? A. We had a mile or nearly so

2. Now state whether Jackson Slough is closed up?

A. It is.

2. When was it closed first?

A. In 1866, I think; that is, the upper end, next the Sacramento River

2. Where it comes out of the river? A. Yes sir

2. It is closed up to that point, that is where the water entered the slough? A. Yes sir

2. It closed up there in about 1866? State in what manner it was closed-how?

A. It was closed intentionally by the Road Master there, put in brush and earth, and built up a big damn across it-

2. What was the purpose of closing it-? A. To make a road was the first idea.

2. That was the first object?

A. Yes sir

Q. What was the main object?

A. Well, after we commenced levees, they used that as a levee.

Q. For the purpose of reclaiming Brannon Island?

A. Yes sir

Q. That was a part of the system for reclainning Brannon Island, to close that slough, so as to prevent overflow from the slough side on the island, I suppose? A. Well, as I told you, the first dam was put in there by the Road Master for road purposes

Q. When the reclamation commenced - A. They connected the levee on to this same dam

Q. Was there a levee all round the northern borders of Brannon Island, on Old River?

A. When?

Q. Well at any time - when first? A. We leveed Brannon Island clear around

I believe – it was closed in 1872

2. You levied it all the way around on the banks of Seven-Mile Slough?

A. Yes sir

2. And Jackson Slough?

A. Yes sir

2. And the Old River and Sacramento River? A. Yes sir

2. The first complete levee was in 1872? A. Yes sir.

2. How high a levee did you build them? A. Well, ~~the~~ we aimed to have it about 5 feet above ~~high~~ extreme high tide

2. Five feet above extreme high tide? How high was it speaking with reference to the natural surface of the soil upon which it was built, about high above that? A. Well, I guess it would average about 5 feet, some places it was much higher. Low depressions would have to be higher levees, and some places

where the banks were higher it was not 5 feet, but I think it would average about 5 feet.

2. Varying a little, being somewhat higher in the lower places? A. Yes sir

2. Perhaps not so high in the higher places. Is that correct?

A. Yes sir

2. The object of that levee was to keep out the high tide, extreme high tide, as well as high water in flood periods, was it?

A. The object was to reclaim the land; yes sir

2. Well was one of the objects- I know it was to reclaim the land, but can sometimes reclaim land by ditching- I ask whether this reclamation was to keep out extreme high tide, and also the extreme flood. A. That was the intention

2. Now when was that levee completed so as to com-

pletely reclaim the island in the sense that you speak of? A It was never raised any, or anything done to it in our neighborhood until after the flood of 1878.

2. I say, was that levee completed in the year 1877?

A. Yes sir

2. When did they first commence cultivating the interior of the island, if they ever did? A. Well about 1874. Well as soon as the levees were built, and we had the water shut off they commenced going back, but there was not so much of it done up till 1874. There was quite considerable of the tule land in cultivation, in 1875 still more. and so on, in 1876 I think nearly all the island was under cultivation

2. To what crops?

A. Well, wheat; mostly wheat-

and barley

Q. What is the nature of the soil in the main body of the island, outside of the immediate river banks?

A. Well, it is peaty and turf soil

Q. A sort of peat, is it?

A. Yes sir

Q. Was it on that island where they were digging for peat, for the purpose of fuel? A. There was a man in there at one time prospecting around, but he told me there was too much sand, too much grit in it

Q. Did they dig deep there for fuel at any time?

A. No, sir, not to my knowledge

Q. Upon none of those islands

A. Not in there, that I know of, and I should have known it, if they had

Q. Not on Brannon Island?

A. No sir

Q. How high was the river

bed raised in 1875 and by G.
in the Sacramento River, and
in front of your residence
up and down?

A. Well, I have no particular
way of knowing exactly how
much

Q. You sounded it in 1866?

A. Yes sir

Q. And found it 16 feet deep?

A. Yes sir

Q. In 1852, it was 20 feet
deep as I understood you?

A. Well, in 1852 -

Q. I am coming back to my
question -

A. I do not know that - I
ever stated that it was in 1852,
because I have no way of
knowing

Q. Well I may be mistaken
in what I supposed you said.
The depth of water was 20 feet -
Didn't you say that in 1852?
Very well - what was its depth
so far as you know in 1852?

A. I do not know

Q. You do know that in 1866

it was 18 feet deep?

A. Yes sir, I do that

Q. What was the depth in 1876, ten years later?

A. Well, I had no occasion to measure it lately, and I could not state correctly, but after 1871 or '72, after I saw the steamer Capitol aground in front of my house, I saw vessels frequently going aground up along in that neighborhood since then

Q. Give me an idea of the depth in 1876? A. I do not believe that I can do it correctly, because I have no knowledge of sounding it along in that neighborhood of time

Q. You saw the Capitol aground there?

A. I did, but I do not know how much she drew

Q. What depth of water did she draw? A. I do not know sir

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Q. Did she ground in the channel or on the bar?

A. Immediately in the channel - she grounded in the channell

Q. She grounded in the channel? A. Yes sir

Q. Well, suppose the draught of the Capitol was 7 feet or 8 feet, or 10 feet? A. That would be the depth of the water at that time.

Q. Well, now, in 1876 and 1877, when the island was cropped, you say nearly all of it, did it suffer any from this seipage?

A. Well, in 1876, we did. In 1876, they had very high water, and the seipage did hurt us

Q. You had high water in 1876? A. Yes sir

Q. Did it come up on your levees? A. I think I am correct. Yes, 1876 we had high water, and the seipage did hurt us in that year

It came up pretty near on our levees, but did not break any of them

Q. Did not break them?

A. No sir.

Q. Well, did your land suffer from seepage then?

A Yes sir, it did more or less

Q. Did that suffer from what you call seepage in 1872? A Well, we had no levees in the Spring of 1872, It was in the Summer of 1872 that we built our levees

Q. Well after your levees were built? A. Well we had no high water up to 1876, after the levees were built — nothing to hurt with seepage or high water from any cause whatever

Q. Well did not the water at 1872, at high tide seep through the borders of the land on the immediate banks of the river, and accumulate in the tules?

A. Yes, and the water would come up on more or less of our cultivated land from the back side, but never ran over those banks as I tell you, from 1852 up to 1861, it never ran over the banks

2. You say that Branon Island was never overflowed between 1852 and 1862 by high water?

A. No sir

Mr Belcher Semmans 1853 He has spoken of the big flood of 1852 and 53?

A. Yes sir, from 53 to 1861

Mr Cattin Was not overflowed in some of those winter between 1854 and 1862? A No sir.

2. No part of it?

A. Well, not of the bank land

2. Well, how much of the interior land?

A. The interior land was generally flooded

2. Every Winter? A. Yes sir,

Not every Winter

Q. Well, generally, I mean in the Winter season? You mean A. Yes generally in the winter, but not generally in the Summer? A. Well, we had stock in there, that lived and did well all those Winters

Q. You say that stock would do well there in all those winters in the interior of the island? A. Yes sir

Q. When they were overflowed with water?

A. Well, they were not entirely overflowed, all the low places were flooded, but there were always the banks of the ~~slough~~ slough ~~land~~ out on the front land, next to the river, etc.,

Q. They kept on the banks of the river, and the banks of the slough? A. Yes sir

Q. They could not keep down in the water?

A. It was not what we call a general overflow

Q. Well, what sloughs are there in there — natural sloughs?

A. There is a slough about in the middle of Seven Mile Slough called the Tomatoe Slough, how far does that penetrate the island?

A. Well there are branches of it run pretty well up towards the Sacramento River

Q. Nearly across the island?

A. Yes sir

Q. What is the general shape of the island. Is it as broad as it is long? or is it a long narrow island, or is it short? A. It is almost as wide as it is long — more square than the average of the islands, I think

Q. Are there little islands in the river there, in the Sacramento River on the other side of Brannon Island? A. Yes sir

Q. Those islands were there in 1852-3, when you

first settled? A. Yes sir

2. What sort of deposit did those islands seem to be made of? A. Well, there is a sandy sediment deposit very much as the banks of the Sacramento River

2 Covered with willows and brush?

A. Yes sir sycamores, etc.

2. Not land valuable for agricultural purposes, was it? A. Well, they have been cultivating one of those islands, immediately opposite Rio Vista, for a number of years, portions of it

2. I ask you whether those lands are valuable for agricultural purposes

A. Well, yes, so far as they went, they were small to be sure, but land was cultivated, and was considered valuable

2 What is the extreme

length of the longest one?

A. I would think about a mile, perhaps a little over

2. How was the channel of the river on the westerly side of that island in early days, the same as it was on the east side? A. Well, the deepest water, the best of the channel was on the west side of the island

2 The banks are on the west side? A Yes sir

2. Not upon the side adjoining your land?

A. It was always considered more or less shoal, and boats did not run next to our side - they ran between the island and Rio Vista

2. And the reason they did not run on your side was, because the river was shoaled there?

A. Well, I cannot give you the reason, but the main channel where

boats ran, was on the west-
side of this little island
Mr Belcher What island is
that? A. This, in front of
Rio Vista, immediately
west of Branson Island
Mr Cutting When was the-
first you ever noticed
any shoaling in the river
I am not speaking now
of sand bars forming above
the surface of the water,
but shoaling in the bed
of the river, at any point
along there? A. I belive
that the flood of 1861 and
'62, was as far back as
I can recollect of any
material change or fill-
ing up on the banks
2. I am speaking of
shoaling in the bed of
the river? if shoals had
been in the river, would
you have been apt to
notice it? A. Well, I had
no way of noticing it
from the fact that I was

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not navigating the river, and did not have any particular opportunity to notice

2. Whereabouts was your residence situated, with reference to that island that you spoke of, that was about a mile long

A. My house is a mile and a half above the upper end of that island

2. What is the name of that island - what is it known by? A Wood Island, it has always been known by in the neighborhood there

2. You say that the flood of 1878 left more sandy deposits than the previous floods? A Yes sir

2. Did the flood of 1861-2 leave any deposits on your land, if so state the extent and character?

A. It left considerable of a deposit, but we did

not think it did any detriment to the land at that time?

Q. That was not the subject that I was asking you about?

A. Well the quantity, I would say, from 4 to 6 inches.

Q. Didn't it deposit in places more than that?

A. It might in places a foot, other places, not any, for instance wherever there is a current it would not deposit; wherever it was slack water the deposit would accumulate

Q. You cultivated those deposits did you afterwards

A. Yes sir

Q. And they were not detrimental to the land?

A. We did not think so

Q. Well in 1866 and 1867, and thereafter, did they leave any deposits on the land?

A. More or less, yes sir

Q. Well, did it leave considerable? A. The 1868 flood did

Q. How much did they leave? A

A. Not as much as the 1862 flood

Q. What is that?

A. Not so much as it did in 1862

Q. In 1878 it left more?

A. None of it I think

Q. Now to what extent has your land generally on Brannon Island been covered with deposits from the overflow of the river?

A. Oh, well there are places it might be 3 feet deep, other places not so much, but all more or less, say from 6 inches to 3 feet deep.

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Q Now state whether those deposits that have been made upon the land, whether they are permanently detrimental to the value of the land for Agricultural purposes

A. The sand is

Q How about the others

A. I do not think the other ever hurt the land much there.

Q I will ask you whether on Brannan Island it is not considered by yourself and your neighbors a desirable thing to have the whole Island covered with the deposit from the River if they could have it done.

Mr Cadwallader I object to that

The Court Omit what is considered by your neighbors Mr Tallin Well I will only take yourself — you have lived on that land since 1872

A. All that material that we got the last flood

It would be detrimental
Q Well take our the Material
that Came in the last flood
and take all that Came in
previous to the last flood
A Well previous to 1878
I think —
Q Previous to 1880 I ask you
the last flood that was here
this Winter, a year ago, take
the deposit previous to that
time — not including those
that went upon the lands a
year ago — what would be
the effects of them upon the
permanent Value of the land
for Agricultural purposes
A. Well it would be no great
disadvantage.
Q Last winter you say it
deposited sand
A. Coarser — Yes Coarser sand
than we ever had had before
Q Well I will ask you whether
that Coarse sand after a few
years when plowed in with the
other soil will not improve
the general Value of that land

A. Well that is something that time will have to determine, I could not say, the Willows grow on it.

Q Is it undisturbed — Suppose it is plowed in with the other soil — Willows will grow with our Cultivation.?

A. We tried that after the flood in 1878 to Cultivate that kind of land but it has a tendency to drift, it will shift banks of it from place to place and destroy your Crops

Q It would drift by the Wind ? A. Yes sir by the Wind

Q You have not rebuilt the levees that were injured by the flood of 1880 and 87

A No sir

Q The Island is now usually under water is it not

A. Yes sir the water flows in and out when the tides comes up and the water runs into the Island and when it goes out it goes back with it

Q. The tide flows over it now
A. Yes sir
Q How high a tide do you have there now,?
A. The Variation you mean— about three feet I think
Q You have three feet of tide there — how much did you have in 1852
A. We thought about five feet — about five feet
Q About three feet now, about two and a half feet would be the difference between the present time and earlier days of 1852 and 53 ?
A. Yes sir
Q And now the tide goes in and out at pleasure
A. Yes sir
Q Through breaks in the levee ? A. Yes sir
Q You name one slough that penetrated nearly through the Island, were there any other sloughs there, small sloughs ?

A. I believe I did not get your question.

Q What other sloughs were there than the one you mentioned prior to the time that reclamation was first started

A. Well this Tomatoe Slough that empties into seven mile Slough.

Q You mentioned that, were there other smaller Sloughs

A. There was another small Slough right east of Rio Vista, that used to flow in and our before there was any levees there

Q Well Rio Vista is on the other side of the River

A. Yes sir about opposite— East.

Q Opposite Brannan Island

A. Yes sir

Q Did the tide ~~y~~ used to flow in at that time

A Yes sir

Q Would the tide reach in into the interior of the Island on the tule.?

A. Yes at extreme high tides it would

Mr Catlin I would like to put in this map as a diagram in connection with his testimony, It would be valuable to explain the testimony of Mr Green — it shows it much better than the map that we used, It is a map of Sacramento County and is marked the Schafer map, This Map, just glance at it and see whether it correctly represents the situation of Brannan Island and Grand Island }

A. I think it does it is a very good representation, this is Jackson Slough as I understand it [referring] =

There is another question I want to ask you about Seven mile slough has that been closed up —

A. No sir

Q That is open } A. Yes sir

Q This levee on the Brannan

Island side of it is there
also a levee on the other
side ? A. Yes sir there is
it has been neglected for
a number of years. that
is Twitchel Island there, there
is ~~aa~~ a levee there
Q there is a levee on the
opposite side of bank of Seven
Mile Slough, on the boarders
of Twitchell Island that are
marked down on the map
A. Yes sir
Q When was that levee built
on Twitchel Island
A Well sir I believe I can
not tell you.
Q As near as you can ?
A. That was built some
years before we built ours.
it must have been built
say in 1869 or 1870 along
there.
Q They commenced reclaiming
Twitchel Island before they
did Brannan Island then
A. Yes sir
Q You think as early as

1869 } A I could not be
positive but I think it
was in the neighborhood
of that time

Re. direct Examination
of
John Shafer

Mr Cadwallader What kind of
water came out of Cache Creek—
Objected to
Mr Cadwallader I want to show
that this water did not
contribute any sand or
sediment to the Sacramento
River
Mr Catlin I only enquired as
to the position of Cache Slough
to show that the waters of that
overflowed Brannan Island
The Court I think they may
explain anything like that
A. The water from the Yolo
basin, Cache Slough was
comparatively clear, not clear
water but not by any means
so muddy as the water

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Coming out of the Sacramento
Mr Cadwallader where did the
filling in of the Sacramento
come from ? A. It evidently
came from the Sacramento
River.
Q What effect has the fill
in the river had on the
tides— I believe you said
it had reduced them about
three feet.
A. Two feet, I think as much
as that
Q What has become of the
levees on Twitchell Island
A Well I do not know much
about that country, I hardly
ever go down there but I
think the north side of
Twitchell Island the levee stand
good today
Q How far is Twitchell Island
from your place?
A Across the country say
five or six miles; immediately
across the Island it would
be five or six miles
Q I mean as you travelled

it down there ?
A. Well six miles say
Q You say that the flood tides running into the sloughs into your Island would overflow parts of it ?
A. It Covered the low lands That was previous to the levees you understand me
Q Now what effect would the ebb tides have
A. It would run out it would go out with the tide and come back with the tide
Q Is your land of a quality down there that required Any additions of sand or slickens =

Question Objected to—

Mr Cadwallader I want to Know whether soil is of a Character there to require Any addition of sand or sediment to increase its fertility Or make it better — was your soil there of a Character that required any fertilizer used, was it rich under rich

Or Over rich
A. I did not get your first
question
Q The Natural down there
What is the Character of it,
What was the Class of it in
Soils?
A. It was the best, the
best land in the World
Q Now you are talking about
the soil?
A. The original land?
Q The original land of
Brannan Island? A Yes Sir
Q You say the sand that
was lodged there would be
Caught up by the winds,
A. Yes Sir. And &
Q And blown in every direction
A. Yes Sir
Mr Catlin Do the waters in the
San Joaquin River ever come
on Brannan Island
A The waters from the San
Joaquin I think seldom if
ever come on Brannan Island
The waters from the Sacramento
flows South as Well as West,

That is what destroys us in time of high flood the San Joaquin being low and the Sacramento high it rushes across our land

Q Don't the San Joaquin get high sometimes when the Sacramento is not very high

A. Well late in the season generally

Q Well low then does that effect Brannan Island

A. Well I suppose it does sometimes run on Brannan Island.

Q You consider Brannan Island one of the best bodies of land that ever laid out of doors as it originally was.

A. All that tule land I believe is the best land to produce naturally if water could be kept off of it

//

Testimony
of
W. H. Hall
Re Called

Mr Hart Have you made
Or Can you make a Calculation
of the Amount in Cubic yards
of material left upon the Gold
Run ridge to be washed
A. I Can make, I have made
such an estimate from an
Inspection of the ground Yes
Sir
Q Well sir what number
of Cubic yards remain there
to be washed according to
your Calculations
A. The superficial area of the
old washings is about five
hundred acres. upon inspecting
the ground and the deep
washings already I thought
that a fair estimate of that
Remaining to be washed to
bed Rock would be in the
Neighborhood of a tract two
Miles and a half long by
Six hundred feet Or two

"feet" should read "yards"
(See p. 4287)

Hundred yards wide and
30 feet depth, that would
give about twenty six
Million Cubic yards, to
Q To be washed
A Remaining to be washed
The Court Upon defendants
Claim } A. No sir, the whole
Mr Hart The defendants Claim
with one exception, There was
One small Claim between —
He means the Gold Hill
ridge } A I mean the
whole gold run ridge, I
do not Know whether the
defendants Claim Cover it
all or not, What is Called
the deep Channel in the
Gold Run deposit
Mr Cadwallader The old Channel
A. Yes sir.
The Court You take the entire
ridge } A. Yes sir.
Q Including Indiana Hill
A. Including all of the mining
property there.
Q That includes all between
Canyon Creek and the Rail Road

A. Yes sir
Q As delineated upon this map
between Canyon Creek and the
Rail Road ? A. Yes sir
Mr Hart In making that
Calculation what do you
make the average depth as
Compared With the depth to
which the mine has been
excavated at Indiana Hill
A. Less than that
Q How much less if you
Can state at this time
A. An average of from five
to fifteen yards less in depth
Q. Did you or did you not
in your former examination
State what your official
position is ? A. Yes sir
Q In your Capacity as State
Engineer have you made any
Calculation as to the amount
of debris annually deposited
in the American River
A. I have
The Court from thes mines
do you mean
Mr Hart In the American

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Amt per annum

River from all mines, not
this alone — what have you
Calculated that to be
A. The quantity was estimated
before —
Q First state the amount
And then make your ex-
planation ? A Well I desire
to give a reason for applying
to my notes or report —
(Referring) In round numbers
One million nine hundred and
twelve thousand Cubic yards
Q Per Annum
A. That amount is not right
that is the amount of water
used — the material washed
out in Cubic yards was
Eight million six hundred
and four thousand Cubic
yards.
Q Per Annum
A. Per Annum As the mines
were worked during the season
of 1879
Q Have you made any Cal-
Culations as State Engineer

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Sacramento ?

of the Amount Annually brought
down the American River in
Suspension of the Detris there
is deposited in the Sacramento American
River } A I have
Q What was that Amount
A. Four Million five hundred
Thousand Cubic yards
Q Have you estimated from
the data in your possession
the proportion of the balance
that Comes down rolling on
the bottom of the Stream }
A no sir
Q At low water } A No sir
Q Have you in your office
which you have made
as the result of those Cal-
Culations } A. The result of
the Calculations of which I
have given the result in
figures }
Q Either the result or the
Cause, the basis of the
Calculation } A no sir No
Start
Q Well possibly I Called it
by the wrong name —

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Have you a card upon which bottles are tied Containing the bases of your Calculation ? A. I have an Exhibit of the sediments that were obtained by filtering Certain Samples of water taken from the Rivers of this Valley and Amongst them were the American River

Q Have you that in Court at this time ?

A I have not sir I will state that this exhibit does not embrace all of the data upon which this Calculation has been made by any means

Q But only a portion

A. It is rather an exhibit of the Character of the information than the Amount of it

Q Have you apportioned this Eight Million Cubic yards between the three forks of the American River ? A I have not

Q Have you the data from which you can make that

Apportionment ? A. I will look at my note book and see referring about how the information stands and tell you

Mr Cadwallader I think that appears in one of the published tables in which you take the miners inch in different localities ? A. I know of no tables published of that information sir.

Q Well without persuing that right now Mr Hall to what point did you calculate that this four million five hundred thousand Cubic yards came in suspension ? A. To the Sacramento River or the immediate neighborhood of it

Q How did you make the test of the amount of Cubic yards coming down in suspension ? A. By taking samples of the water at different seasons of the year or periods of flow, and filtering some of these samples so as to be able to

Estimate the quantity carried per Cubic foot. From such experments and comparing those results by the eye with a number of other Samples only settled in the manner exhibited here in Court a short time ago as I understand it

Q. By Mr Allardt in a tube there? A. Yes Sir

Q. Where did you take Samples of the water?

A. Water samples were taken generally from either the Mouth of the American River or from the 12th Street bridge generally from those points

Q Did you take any sample further up the River?

A. I believe there was some Samples taken at Folsom

Q Did you take them in person? A. I did not

Q How were they taken by whom? A. I am not able to state without referring to the records

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Q How were they taken generally
A. Those taken at the mouth
of the American River
Q I mean those at Folsom?
A. There were but few taken
at Folsom, they were simply
dipped from the surface of the
water.
Q I mean how were they
generally taken whether under
your direction or not
A. They were taken under my
direction by an assistant
Engineer,
Q By an Assistant Engineer?
A. Yes Sir
Q. How many samples do you
remember were taken in these
examinations you made?
A. Altogether?
Q. Yes. In the American River?
A. I am unable to state from
by recollection
Q. How did you make the
calculation of the amount
deposited in the stream, the
American River, annually.
A. By obtaining information

of the amount of water used in the process of Hydraulic mining. By ascertaining the circumstances under which it was used in the different cases by ascertaining the amount that of material that a given quantity of water would probably wash out under the circumstances presented and thus estimating the total quantity moved by the water used.

Q. From or whom generally did you obtain your information as to the number of miners which used in a given mine, say the Gold Run mine?

A. Well it generally, you ask me.

Q. Yes

A. Generally I obtained the information from the Superintendents or the Secretary of the mines or mining corporations and from the Engineers when were em-

employed in one way or another as expert in those mines.

Q. From whom did you obtain that information in case where the Superintendents did not give you the amount? A. They from some one who as I had reason to believe was familiar with mining operations in the neighborhood.

Q. Can you mention any persons in particular.

A. Well in that locality that is the American River region?

Q. That is what I am speaking of? A. I obtained information from a Mr Ureu, Mr E. L. Ureu I believe of Dutch Flat. And from a gentleman who was superintendent of the Dardanelles mine, whose name I have forgotten right now. He gave me not only information of his own mine

but of a number of others.
Q. What was the form of the ~~for~~ report that was ordinarily given you by the Superintendents of the several mines? A. It embraces a statement of the number of miners employed under his or their directions each month during the season of 1879. Under In some instances a statement also of the number of miners inches used during the several preceding years. The total. And in some other cases going further into the detail, the grades and dimensions of the tailing sluices were given and the heights of the banks, the size of the nozzle used &c.
Q. Now is there any means by which from such data you can calculate the amount of cubic yards washed by each miners inch?
A. There are certainly such

means, by such observations made, what the circumstances where known.
Q. In taking your samples from the mouth of the American River, where did you take them from, what portion of the ~~river~~ water,
A. Generally speaking, only from the surface, but as I remember now, from some ~~distances~~ ~~from~~ mid depth and also from the bottom or near the bottom.
Q. From these experiments in what proportion or how did you find that this matter goes ~~in~~ in suspension relatively at the top or the bottom or in the middle.
A. With respect to the American river I am not able to state very particularly but the general result from all the ~~rivers~~ I could state if you desire
A. The general principal
A. Yes. The amount of

sediment carried in suspension within a foot of the bottom which was about as near as we could take a sample fairly would range from one and one fourth to two and one half times as much as were carried in suspension at the surface.

Q. Did you ascertain from your experiments whether or not the decrease was gradual or abrupt from the bottom to the surface.

A. The result of these observations have never been analyzed closely enough to be able to answer that question

2 State whether or not your inquiries in relation to the amount of miners used on the banks of the American river or in mines tailing into the American river gives you the amount in each fork:

A- The estimate was not made in that way. From the information in the office I think it could be made

2 You think that it could be made?

A - I think it likely that it could be made

2 - Now if you know how much water was used in each Fork, could you determine approximately and give the proportions of debris that comes from each Fork?

A certainly. and if the circumstances are known about under which it is used in each Fork.

2- Upon what does the amount of debris washed by a miners inch depend?

A It depends upon, first the character of the material being

moved, the height of the bank from which it is washed and the volume and pressure of water projected against it, the grade and dimensions of the tailing sluices.

2 How much does a miner mich move on the North Fork a Gold Room?

A- It will vary on the North Fork. I should say according to the circumstances and according to our observations between two cubic yards and seven cubic yards to a twenty four hours inch.

2- Did you calculate the average?

A- I took the average at four and one half. That is greater than the average between two and seven. but the circumstances under which water would only move two cubic yards to a twenty four hours inch have not yet been developed or had not at that time on the

North Fork

2 - According to your ~~c~~ calculations how did the North Fork compare with other Forks as to the amount, the average amount of cubic yards washed by a twenty four miner's inch.

A - I am not able to answer that question specifically ~~##~~ There are some places within the American Basin, water shed, where more will be used, more material will be moved by a twenty four hour inch than on the North Fork, and on the places less, but as to the average for each Fork of the river, I never have attempted it.

2 Did you take the average of all the Forks?

A I took the average of four and one half cubic yards for the entire basin.

2 - For all three of the Forks?

A Yes

2 What was the character of

the debris that you took from the river at the mouth?

A Well it was ordinary river sediment, composed of clay, clay particles, some fine sand washed evidently from silicious deposites and from slate rock.

2 - Slate rock?

A - Yes

2 How did the material differ as you went towards the bottom from the top of the stream if it differed at all?

A. The material held in suspension near the bottom of the stream is I believe invariable of a heavier character than that near the surface.

2 and what was it general character?

A That near the bottom was more especially composed of silicious particles, although I do not know that they were predominant.

2 How far were you from the mouth, the immediate mouth of the american river when you

caught these particles coming down?
A. I did not always take the sample.
Q. Those that you did take?
A. I was present sometimes when they were taken and when the river was observed, but generally speaking it was from 100 to 200 yards in the river.
Q. When did you find that the worst of this material were carried, during high or low water stage?
A. I will state in direct answer, during high water stage and then I will explain that while the recorded results of this work shows certain figures as the outcome of the examinations made of specific samples there were many other observations conducted as I have explained simply by observing the water and dipping it up in a glass and frequently taking the water to the office and there settling it, there contributed

to the formation of a judgment on this point.

Q. From your examination of the material coming down the stream and that which you caught how would it compare with the sediment and sand that would be formed from the banks of the Gold Run mine?

A. I could hardly give a correct statement in reply to the question. I certainly recognize some material in this sediment which is recognizable in the banks of the Gold Run mine.

Q. What portion of that material did you recognize as being such as you last described? A Siliceous sand and clay particles.

Q. Have you noticed the same material elsewhere than at Gold Run in the mines? A Certainly.

Q. I mean in the mines in the American basin

A. Certainly.
Q. Where else have you noticed it? A. I have noticed it more especially at Dawa Hill and at points in the neighborhood of Placerville on the South Fork.
Q. Now having the mountain region and coming down into the Valley can you state whether or not you have ever seen any earth from which these siliceous sands would be taken or would be formed by the operation of water?
A. I could not state positively. It is my impression that I have but I have never made any examination that would enable me to state positively yes or no on that question.
Q. What proportion of the material that you caught in the riffles was composed of sand?
A. I think I answered awhile ago that I was unable to state

what proportion.

Q. Can not you make some approximation of the proportion? A. I think there are some samples present that would exhibit it. Now I am not certain with respect to the American coin on this question but I think there are some samples present which would exhibit a proportion of one fourth particles of silver in the samples.

Q. How did the material in general appearance at that you caught in the river compare with the material that you see here in this glass tube? A. It compares very favorably or very nearly with the material in this glass tube about from one half inch to an inch above the bottom where the sands and the clay mingle.

Q. Now what is the difference below? A. Below the material is composed of a

greater proportion of sandy particles that are of themselves larger than those of which I speak.

Q. The sand is coarser?

A. The sand is coarser.

Q. And above?

A. There is a greater proportion of fine clay, and the clay seems to be finer although it may not be.

Q. Can you state any reason why the coarser sand and the finer clay would not be at Sacramento conceding or assuming that the material does come from that agency or would not be in suspension in the water at Sacramento, I mean.

A. The coarser sands in the lower portion of the river, such of them as are brought down would be rolled along the bottom and not carried in suspension. That is to say the sands which would or might be carried in suspension

in the upper portion of the mix would probably be carried along the bottom in the lower portion.

Q. And the fine material, what have you to say about that? A. I can see no reason why that should not be brought down.

Q. Where would that probably be? A. It would probably be on the surface films of the water.

Q. Right on top?

A. Near the top at most depth.

Q. State what you did with the statements that you received of the mixes used in each mine and what use you put them to? A. The figures given upon these statements were tabulated, arranged according to the water shed into which the water was dumped and the aggregate worked out from each as to

the quantity needed.
Q. What did you do with the tables that you made of these minis inches?
A. They are yet I think on file in the office.
Q. Have you made any extensive observations up and down the both south and middle forks of the american river with a view to determine the character and extent of the mining operations there?
A. Personally I have not. There have been some examinations made on the main river as far up as the south fork and thence continuing up to the middle fork and along the north fork by one of my assistants.
Q. What is his name?
A. Boshke.
Q. Where is he?
A. On the northern coast of California or in Oregon I do not know which.

Q. When did he go there?
A. Some months ago. Six months or more.
Q. Have you ever visited the regions of the North, South and Middle forks or either of them? A. I have made quite a careful examination about Gold Run and about Iowa Hill. I have examined with less care the neighborhood of Placerville or the mine in the Neighborhood of Placerville on the South fork. I made simply a trip through the country lying on the divide — lying on both divides between the South and middle and the middle and North forks
Q. From your examination can you state approximately about the proportion of hydraulic mining that is done on these three forks of the mine. A. No sir I can not.
Q. Can you state where the

most extensive hydraulic
mining is done on each
of these three forks from
your examination?
A. At the time of my ex-
amination the most ex-
tensive mining was going
on the North fork.
Q. In your examination
of the middle and south
forks did you find any
mine carrying in mag-
nitude with the Gold Run
mine — In the magnitude
of its operations and workings
on either the south or middle
forks? A I remember
that the Indiana Hill
workings made an im-
pression of greater magni-
tude on my mind, than
of any of the other three I
saw. Though there were
some other pretty large mines
Q. Were there any as large
as the Indiana Hill mine
that is operating with works
and apparatus as large?

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Mr W. C. Belcher, Let him describe what he saw.
Mr Hart: Go on and describe it. I was trying to shorten it.
A. My recollection is that that is the largest hydraulic mining operation that I saw but they it is to be remembered that a portion of this ground I only traveled over without absolutely examining the mining except just to ride to the openings of some of them and looking at them and going on.
A. Were the mines in operation generally when you were? A. I found mining operations going on pretty generally through the American basin

Q. How did you find the Gold Run mine to compare with the Iowa Hill mine
A. Now I remember it, the Gold Run mine was not in operation the time I was there. The Iowa Hill mines were not in operation when I was there. I judged by a comparison between those mines, by the size of the pit and the outfit for working which I saw — To answer your question correctly — The Indiana Hill pit was the largest that I saw, this deep pit was the largest that I saw any place. There were other surface washings that were larger. For instance the surface that was washed at Gold Run was larger than the deep pit.
Q. I am speaking of the mining operations, that is the extensiveness and magnitude of the operations that

you saw. Of course you saw the pit and the grades then and from them formed your estimates?

A. The ~~Gradient~~, so far as the outfit for mining was concerned and the magnitude of the pit of the Gold Run washings was greater than at any of the similar mine that I saw.

Q. On either fork?

A. On either fork.

Q. The recognizance was not all made at one time, at the time that I went to Gold Run I did not go to any other place except Dutch Flat.

Q. The other day when you were on the stand before you stated that you found by a calculation that about 52,000,000 of cubic yards had been washed from the Gold Run mine, that is Gold Run Hill

A. Yes

Q. What did that include?
A. The estimate that I made was intended to include only the old top washings exclusive of the ash pits in the Indiana Hill washings and the Cider washings.
Q. Did you at that time estimate the amount the amount that had been washed out of the pit at Indiana Hill?
A. I did not, for the reason that I intended immediately to have a survey made of those washings and the result would be more reliable than any estimate I could make.
Q. Did you have the survey made? A. I did.
Q. Who made that survey?
A. The gentleman Mr Boshke to whom I referred a while ago.
Q. Is that survey on file in your office? A. I have

a report addressed to me by Mr Bashke giving the result of his survey and the note books are on file.
Q. At that time was there any survey made of the quantity washed out of the pit at Imaana Hill?
A. There was.
Q. And a measurement?
A. There was.
Q. State whether or not at that time you made any eye measurement of the general formation and size of the pit?
A. Well if I did I made no record of it. I did not charge my memory with it otherwise than the general impression of its magnitude that I spoke of a while ago.
Q. Have you ever at any time made a calculation in your own mind of about the number of millions of cubic yards that had been taken out of the pit at that

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time? A. Myself.
A. Yes? A. No Sir.
A. Nothing from your examination nor from the survey?
A. No Sir. I have checked the estimates with this survey
A. What amount does that survey show to have been taken out of the pit up to the time it was made?
Mr Belcher We would like the survey itself to be presented. This evidence is hearsay and incompetent.
Thy Witness I thought I had that report with me but I have not got it.
Mr Belcher You can bring it with you tomorrow?
A. I can.
A. With the details of the report? A. I can bring the report.
A. Do you know nicely as yourself as to this report. Have you verified the figures? A. I have verified the figures, as such

verifications usually are made by an inspection of the drawing made from the field notes, by scaling upon the drawing the dimensions of the pit, and a rough calculation of the cubic contents, which would check nearly with the figures given by the more detailed report.

Q. Have you a distinct recollection of it?

A. I have a distinct recollection of it.

Mr Belcher We will withdraw the objection and you can answer it and bring the report in afterwards.

The Court Do you want the report and also the notes of the survey. Let the witness understand what you want.

Mr Belcher I will be satisfied with the report.

Mr Hart. State to the Court what according to the survey was the amount of cubic

yards washed out of the hill at Indiana Hill?
The Court. Below the old washings?
Mr Hart. Yes.
A. Indiana Hill, deep excavation, three million and forty seven thousand cubic yards.
A. When was that?
A. That was sometime in the fall of 1879. I am not certain about the month.
Mr Cadwalader. About the time? A. September probably.
Mr Hart. You said that you have made a table of the cubic inches used on the American River. That is a tabulated statement that you have made?
A. Miners inches.
A. Miners inches, not cubic inches. What was that amount? A. Summed up?
A. Yes. A. For the season of 1879 One million nine

hundred and twelve thousand
nine inches.
A. I will ask the witness
before he closes his examin-
tion to bring the bottles con-
taining the debris that he
took from the American
River that they may be iden-
tified and exhibited in the
Court Room, I ask you now
in relation to the comparative
sizes of the Hydraulic
mine on the three forks
and confine your testimony
now to the pits, pit like
that which you saw at
the Gold Run. Did you
see any pits of any Hydrau-
lic mine that compare
in dimensions with the
pit of this Gold Run
mine? A. Yes I saw
surface washings,
A. No. I mean pits, deep
pits like that one? A. You
saw the surface washings
and the deep pit?
A. That is the case at

the Gold Run but it is not always so.
Q. I ask you if you saw any such pits as that at any other mine that you saw? A. Well sir, it is impossible for me to state whether the workings that I saw were always down to the bed rock, so that I cannot answer that question.
Q. I am speaking of the general dimensions and size of the pit? A. Yes. There are excavations covering a greater area.
Q. I am not asking about that, I am asking about pits, and not surface workings. I am not talking about excavations comparing in depth with this one for instance?
A. I saw one district where might be called rock gravel workings as contrasted generally to the surface

gravel washings that were as deep as that at Gold Run, the Indiana Hill, but then I cannot say that the washings that I drove that were longer than this particular deep hit were down to the bed rock, as deep washings or not. That is to say some of them.

Cross Examination
of
William H. Hall

Mr Belchy Mr Hall, you have spoken of Placerville and started to answer but was checked by the Attorney General. I would like to have you tell us. Mr Mr Cadwalader. (Intg) Will you now bring that other paper with you. I wish you would bring it you were table if you can find it at the office, from which this total of nineteen

hundred thousand cubic inches was compiled.

Mr Belcher You started to tell about the excavations which you had seen at Placerville and the extent of them. Will you tell us now?

A. I did not say at Placerville.

Q. At or about?

A. In the neighborhood.

Q. Or in Eldorado County?

A. What shall I tell about them?

Q. What area? A. Surface area?

Mr Hart are you speaking of the mines along the American River now?

Mr Cadwalader I insist that the gentleman shall name the mine. There is a well known mine up there.

Mr Belcher I will speak then of one. The Eldorado company? A. The Eldorado deep gravel water and mining company, or some

such name as that, I say the mine operated by that company. I do not remember its name.
Q. No matter what it's name was. State approximately the area of ground?
A. I had has been nearly three years ago and I did not even at that time make an estimate of its area. It has a large area, I know that.
Q. Larger than the area of the mines at Gold Run?
Q. Than the whole Gold Run ridge?
Q. Take all that was worked then two miles and a half long by all the breadth that they are working?
A. It did not impress me so did it?
Q. It not impress you so?
A. No Sir.
Q. Larger than that this put you saw? A. Yes.
Q. How many times larger?

A. The pit is a well defined excavation.
Q. The pit at Gold Run?
A. At Gold Run, the Indiana Hill pit. The workings were well defined in the outlines. The washings at or in the neighborhood of Placerville and particularly those of this deep gravel company are not so well defined. That is my recollection. Therefore I am not able to make a definite estimate. I should say though that I remember of seeing a tunneling timbered off there five or ten times greater than the area of this special deep pit.
Q. What the area?
A. I have the area of this special deep pit.
Q. Is that bottom gravel that they are washing?
A. They may have been washing bottom gravel at some point there, but my

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recollection is that it was not all bottom gravel, or the bottom gravel had not been washed off of this considerable area that I spoke of

Q. But do some part of the claim they were then working bottom gravel?

A. Yes. That is my impression, although I made no sufficient examination to be able to convince myself of it.

Q. Did you go through the mine at all at that time?

A. I entered the mine, but I cannot say that I went entirely through it.

Q. Were there at that time many other mines in the vicinity? A. There were several.

Q. Did you take any note of the numbers? A. I did not.

Q. Or have you entered any time since?

A. I have not

Q. Either directly or through your assistants?
A. No Sir. Except in the matter of water returns from the several mining companies and from others. I have no definite information of the extent of mining there since.
Q. Did you go to the Dardanelles? A. I went to the Dardanelles. Yes.
Q. What do you say about that as compared to this pit? A. As compared to the pit above as I saw it, the area washed off was as great if not greater.
Q. Was it not several times greater? A. I am not prepared to say that it was several time greater.
Q. Are you prepared to say that it was not?
A. I am prepared to say that it was fully as great, if not greater. It might have been twice as large but I cannot say so.

Q. How about the height of the banks? A. I remember that there were some places there, but I do not remember about it was the Dardanelles or not — but I am under the impression that it was where the banks were higher than those at the Gold Run, considerably higher. I was impressed by that.

Q. How about the heights of the banks near Placerville?

Mr Hart. At what mine?

Mr Belcher We have only spoken of one mine there.

Q. The heights of the banks there at the El Dorado duck gravel mining and water company's mine were in places at least two hundred feet high.

Q. Was the same company working other mines at the same time at other places?

Q. The El Dorado duck gravel mining and water company?

Q. Did you go to a place called Coon Hollow at that time?

A. I did, yes Sir

Q. Was there extensive mining there also?

A. I did not stop at that place. I Knew there was mining going on there

Q. Do you Know - and if you do, State - how many hydraulic mines there are within the basin of the American River?

A. I can not state from recollection

Q. Have you a table of that, or any documents in your office that will show

A. I have returns from the different water companies and memoranda concerning the different mining companies. I am not certain that the returns from the water companies always indicate the number of

customers they have. So that I can not say whether those papers taken together will actually give the number of mines operating at that time.

Q. Can you approximate now in a round or rough estimate

A. The mining localities I have an idea of. But how many claims are operating in each locality, I must confess that I have not an idea of

Q. Did you assist in the making of Colonel Mendells report? A. I did not

Q Have you seen that report

Mr Hart – We object to that as irrelevant and immaterial whether he has seen it or not.

Mr Cadwalader – What report is that

Mr Hart – Mendells report.

Mr Cadwalader – Of what date

Mr Hart – I dont Know. I

object to it

Mr Belcher - I ask the witness if he has seen his report of this current year.

A. I have

Mr Hart (Duty) One moment. I am objecting. I dont see its materiality.

The Court. I do not see its materiality

Mr Belcher - Does the Court exclude it?

The Court - As at present advised

Mr Belcher - I was asking for the purpose of getting the approximate number of feet of the El Dorado claim. Did you give him any information in regard to the matter?

A. I gave Col. Mendell's assistant access to the water reports that were in our office! that were in the State Engineers office

Q Then if I understand you, you have made no

computation or estimate of the extent of hydraulic mining in El Dorado County within the American basin?

A. None except from the returns of the water companies' the water returns. And from such other information as to the circumstances of using the water I could gather by inquiry. And by inspection of some places.

Q. Are there any other that you have here in mind; extensive mining claims except those you have named? You have named the Dawa Hill? What is the approximate extent at Dawa Hill?

A. I should judge that there had been hydraulic mining conducted over an area of as much as two hundred and fifty acres.

Q. Two hundred and fifty acres you say.

A. I don't mean to say that it has all been mined off. But the

mines are scattered, the superficial works are scattered over that area.

Q. Over two hundred and fifty acres of area A Yes Sir.

Q At what depth?

A. As to the average depth: It would be impossible for me to give it. I made no memorandum at all. I remember having seen banks there of workings that were probably one hundred feet high or more. But I made no estimate whatever.

Q. Did you see a claim there or claims of Breese and Wheeler?

A. I remember that name.

Q. Near Michigan Bluffs? Have you been there?

A I rode out to Michigan Bluffs.

Q Did you see the claim of these parties at Michigan Bluffs?

A. I remember distinctly that name! That combination

of names. And I believe I saw their mine. I know that I have a water return that includes that amongst others.

Q. Have you any present recollection of the mine that they were at work there upon?

A. No definite recollection of it

Q. Or of the height of the bank. A. No Sir

Q. Have you any general recollection of the extent or area at Michigan Bluffs? The ground worked over or that had been worked?

A. I have a general recollection to this effect! that the ground worked over or showing evidences of having been worked over, at least superficially, was from a half to two thirds as great as that at Iowa Hill

Mr Hart — Where is that

Breed and Wheeler?

A. At Michigan Bluff.

Mr. Belcher — Now refresh your recollection a little in regard to that: See whether you should judge it to be half or twice as large? I would like to have you refresh your recollection, so as to determine in your own mind whether it is not quite as large or larger even than that at Iowa Hill?

A. I have no means of refreshing my memory on that point, Sir.

Q. How long since you visited those claims?

A. It was during the season of 1879. Just before the rains began.

Q. Now, when was it that your assistant went to the mines that are in controversy?

A. That same fall.

Q. In September 1879?

A. Yes, Sir. I wish to

state, I would like to state here, that I suppose that it will be understood that my trips between Placerville and Iowa Hill and back was little more than a drive through the Country.

Mr Belcher. That is the way I understood it: That you did not make any such examinations, that you are willing to attach any Considerable importance to them.

Mr Hart - She did not say that

The Witness - only in a portion

Mr Belcher - And that the only examination that you made that was at all careful was at Gold Run?

A. And to some little extent at Placerville, But still that was nothing like as careful as the examination at Gold Run.

Q Having made the examination which you,

yourself made at Lead Run, why did you send your assistant up there to take careful measurements as to the exact bed of the pit and so forth

A. Because I wanted to get some definite information as to the amount of material which a given quantity of water would wash out. And I was told that I could get the statement of the amount of water that had been used in that deep pit. That it presented an opportunity of making comparisons

Q From the data you obtained from that pit and the working of it what was the result?

A I will have to refer to my notes for that

Q Very well Sir?

A I have a recollection; but I am not certain that it is absolutely right. The

Gold Run

Duty of Water

result of the survey and measurement of the pit, give its solumne to be Three Million and Forty Seven Thousand Cubic yards. Amount of water returned to me, that is, furnished me in the statement by the Superintendent or Secretary of the Company was Six hundred and Fifty Nine Thousand and Eight hundred And One, 24 hour inches; — supposed to be used in making that excavation. Which gives a duty for a twenty hour hour inch of base and six tenths cubic yards

Mr Hart — That Calculation is as to the deep pit or the deep pit and surface washing.

A I The deep pit only.

Mr Belcher — Did that pit as Calculated in this measurement consist alone of a deep hard gravel or of a light surface material as well?

A. It consisted of so much light surface material as had been left below the plane of the original surface wash; together with the ~~top~~ deep gravel

Q What proportion did you count as deep gravel, and what proportion of the light or surface material?

A. My recollection is that there was a partial layer of clay around the rim or around the face of that pit. That was about half way between the upper rim and lower, and the base. That below that clay, there was a much harder material in appearance; a more firmly cemented material, or larger boulders, than above it. So that perhaps about one half or a little more was the harder material; and the rest the lighter

Mr Hart — He is comparing the two kinds there in the pit. The two kinds

that are to be seen in the face of the pit. In describing this, is this comparatively so? or is this a soft material, such as you usually see on the surface?

A. Only comparatively.

Mr Belcher — Have you made computations and measurements at Dutch Flat on this same gravel bed to determine how much was taken out by one inch of water? A I have

Q. On bottom gravel?

A. Yes Sir. On bottom gravel.

Q State what was the result that you arrived at there?

A. There were three pits measured at Dutch Flat, from the owners or proprietors of which I afterwards obtained a water statement. And one, the southern grass pit —

Mr Cadwalader (Dutch) As

that on this side of the divide or the other?

A. On that side of Dutch Flat; of course on the north side

Mr Cadwalader. Well, that is a Bear River mine.

Mr Belcher — What is the duty of the water?

Mr Hunt — You are getting into another System. We are speaking of the duty of the water on the American River.

Mr Cadwalader — I think there was a ruling on that the other day; that they could not go across the divide

Mr Belcher — The same grant. Separated only by a rail road embankment at that time

The Court — I suppose the object is to arrive at the correctness of these measurements? Not because you wish to trace that gravel.

Mr Belcher — yes Sir

The Court — Then I think he may state

Mr Hunt. To that extent I have no objection to the testimony

Mr Cadwalader — I wish you would just read that question Mr Reporter.

The Reporter read: State what was the result that you arrived at there

A. It showed an excavation of nine hundred and ninety eight thousand eight hundred and fifty cubic yards. By two hundred and ninety nine thousand and one Hundred and forty four, 24 hours inches, A duty of two-and two one-thousandths yards, per 24 hours inch.

Mr Belcher. That is one. There is one other?

A. The Polar Star showed an excavation of Six hundred and Eighteen Thousand one

Hundred And Thirty Cubic yards. By four hundred And twelve Thousand And Seventy, 24 hour inches. With a duty 149/100 Cubic yards. The Franklin mine Showed An excavation of Three Hundred and Seventy Six Thousand And Hundred And Forty Seven Cubic yards, with ninety One Thousand Four Hundred And Nine, 24 hour inches. Giving a resulting duty of 3 4/10 Cubic yards.

Q. Now what should be the duty of water, in your judgement, upon this bank or pit? A. Layer of ninety feet.

A. Between two and two And a half. I will say two And a half per 24 hour inch. I will say two And one half for ninety feet.

Q. You give it for ninety feet.

A. Yes Sir. I will say

two and a half.

Q. Will you make your estimate for mixing best? You make your estimate for lifting best?

A. The walls there as I remember them here are average of about one hundred feet high. They may be a little over, so that when you say a layer of lift you mean a layer of half of the wall, from the bottom to the top of the excavation

Mr Cadwalader — That goes to the red rock?

A Yes sir; to the red rock.

Q. What is that red rock made of?

Mr Belcher Do you want to go into that inquiry.

Mr Cadwalader — I want to know from my own information

Mr Belcher. Well some of

us will take you out some time And give you information ~~of~~ on that subject

Mr Cadwalader — Very well I want press it of your object. I simply wanted to know

Mr Belcher. For the ninety feet what would you say it should be, from the best judgement you could form from its appearance? When you speak of ninety feet do you mean area, surface.

A. Ninety feet up

Q. And that carries you to the upper rim A. Yes sir.

Q. I understand the bank is some where from fifty feet in some places or parts to one hundred feet in others

A. Well I meant to convey the idea that the average elevation of the wall of the deep pit was one hundred feet

Mr Cadwalader What wall

would that be?

A. That wall of gravel that stands there.

Mr Belcher – Now as I have it before me, if I remember correctly, four hundred and a half miles in length you gave an estimate of six hundred feet in width and ninety feet in height?

A. I estimated it at an average of thirty yards in depth, which would be ninety feet. I think that is a little under what it is

Q. What on that amount on the whole of it – would be the duty of water?

A. I think that there is farther to the north and East in that deposit, a larger proportion of light material left, than there was visible in the bank claim known as the Indiana Hill claim. From that I judge that the duty would be greater on the average than the ex-

pearance of this bank and the result of these experiments would show. So that I will say that the duty would be there an average of from four and a half to nine cubic yards. In washing out what remains. I have another reason which guided me in that judgement

Mr Hart Give it

A. I made another measurement at had another measurement made in the Lyed Run washings. Namely, that of the Cedar Company's claim I think that is the name of it.

Mr Belcher. Cedar Creek?

A. No Sir. There is a cedar Creek water Company And a cedar mine. I think they are separate organizations. The result of this Sample or experiment was that there was Two millions Fifty Seven Thousand Four Hundred Cubic Yards washed by the use of Two Hundred

and Seventy Four Thousand Five Hundred and Sixty Two Miners Inches as returned to me by the Superintendent. Giving a duty of Seven and a half Cubic yards to the 24 hour inch. Now I know from many exhibitions and inspections, that this material in this last examination was very much lighter material than that washed out in the deep wash of the Gold Run or the Indiana Hill.

Mr Belcher. Was that wash on the same grade?

A. I do not know that it was of my own knowledge.

Q. Would that have any effect upon the quantity?

A. It certainly would; as I stated a while ago.

Q. The material was lighter; but as to the grade you do not know?

A. I do not. I would say that I always supposed that it was washed

through some tunnel - a branch tunnel, but I do not know it of my own knowledge.

Q. Not upon the same companies, certainly? You mentioned it as a different company?

A. It is a different company.

Q. How long a time were you up there making your examinations?

A. I was on the Coyed Run Ridge one day and a part of another one. That is my recollection. I stood at Dutch Flat and was around over the country there for ten days, or twelve days altogether.

Q. You have given some statements in regard to sediment in the American River or from the American River: and particularly results of certain sampled or experiments which you took or made up by taking

water from the River?. Is the material or data from which you obtained those results due to be found in or gathered from your report? Your printed report?

A. I believe that the results ~~that~~ of are the complete analyses if I may use the word, were printed. But the results of are the inspections which were compared with these analyses were not printed. Nor any of them

Q. But only the results?.

A. The results.

Q. The results which you have given here in evidence were all calculated from the data which are down in the book with the exception - as I understand you - that occasionally you would take up a glass of water and look at it

A. No sir. I do not wish to be understood in that way

Q. Well, let us have it as

it was.

A. I supposed that I had explained that. Samples of water were taken from the river, and I may say quite a large number of instances.

Q. Approximately, how many?

A. Well probably there were probably fifty samples taken, that were conveyed to the office as to the little station which we had down here on the river. Now then, there were certain of those samples — about a dozen — ten or a dozen — ten or a dozen of those samples — yes, more than that — I don't remember exactly how many, but the record will show; certain of those samples that were taken, with a lot of others — there were several hundred taken in all probably — were sent to Berkeley: sent to the

Labratory there and there filtered and the result obtained, as well as the result which we got by this other process, was noted. The result obtained there was considered to be a good one. Now, before they were taken down, there were samples taken out at other times and at other places, possibly, that were allowed to settle, with those that were taken away, in the jars. Sometimes in a tube similar to this. And a comparison was made between this stack of samples and a few that were to be picked out to be filtered at the labratory in Berkeley. And a memorandum made up from this, so that by knowing definitely how much sediment was taken in the sample, which went through the complete process, we might very well approximate to how

much sediment was taken in the most of them which did not go through this complete process. Then farther than that there were notes made as to the appearance of the water at different streams at different times during the running of the bloods; the American Streams Amongst others. So learn as to whether they were carrying more or less sediment, apparently. By taking up water in a glass within a day before or several days before the sample was taken. You will understand that to have taken a great number of samples and put them through a complete analysis, a thorough process of examination, would have been a very expensive operation. And I had to arrive at the same thing in results with the least

amount of work

Q. The estimate which you gave of four and a half million yards, you made from the data given in your tables

A. Not altogether as I have explained

Q Would your tables present a different result?

A. I am not altogether certain with respect to the American River. You are to understand Sir, that there has never been published the information from which any kind of an estimate could be made of the amount of material carried, the total amount of material carried in suspension by the river, by the year. The volume of water carried by the river has never been given at all.

Q. Your estimate was four million and a half yards of sediment? What

proportion of this did you compute as coming from agricultural sources,

A. That was stated in the printed report. I think you took the book from me, didn't you? Mr Cadwalader (examining) Yes; that is it.

Mr Cadwalader — You mean the natural wash? You dont mean the agricultural wash?

Mr Belcher — I will explain. What part from the natural wash and what part from the agricultural wash, and what part from other sources?

Mr Hart — Is this estimate based upon any certain data? If it is we will allow the witness to testify. If it is not an estimate but some approximation or guess not bounded on any knowledge which would enable him to form anything more than a guessing speculation or a guess upon the subject, we shall object.

Mr Beecher. Is this made upon such information as you had obtained and considered reliable?

A. It was made upon information that I had obtained

Q. And from your own observation as well.

A. And from my own observation and from such information as I considered reliable for the purposes of this report

Mr Hart — You make him your witness for this purpose.

Mr Beecher — No Sir. This is upon cross-examination. And proper and legitimate cross-examination.

Mr Hart. We object

The Court — I suppose it is proper to ask him if this all came from the mines.

Mr Cadwalader. I want the question to be as broad as the Answer. The way

Mr Belcher propounded it -

Mr Belcher (Duly) You had better propound it for me.

Mr Cadwalader - I will.

Mr Belcher. You will wait a little first

Mr Cadwalader Stesaid", agricultural sources. I only want to have a question that covers the whole ground. Natural causes as well as agricultural.

The Witness, Shall I answer the question?

Mr Hart - Answer as to your estimate. As you make it now. That is what you think it is at this time. Not merely reading from the report.

Mr Belcher. You will answer the question. I put

The Witness. Well, I was asked whether I did make an estimate

Mr Belcher. Yes Sir.

Witness. I said I did.

Mr Hart Allright: Let it go in

The Witness. I estimate a total of four million five Hundred Thousand Cubic yards. Of that a million Cubic Yards are known natural wash. That is to say, washed from the hillsides, uncultivated or cultivated, and known old mining excavations And dumped not now in operation

Mr Cadwalader. That is a round million?

A. Yes Sir. A round million

Mr Hart. Let the witness explain now if you will — to avoid re-examination — how much is due to old mining operations

Mr Belcher. I prefer that you would wait and examine him when it comes your time.

Mr Hart. Very well Sir.

Mr Belcher. Have you had any experience Mr Hall, either as a practical miner, or as a mining engineer, other than what experience you have

had since you came into your present office

A. I have not. Nor do I pretend now to be a mining engineer.

Q. If I understand you correctly: you have not yourself or through your office made any especial examination or even any careful reconnoissance of any portion of the basin, with the exception of the American River from its mouth to Folsom? Up to Folsom, to the mines of this defendant? And perhaps a little above?

A. That is all the careful examination that has been made.

Q. Now in that examination did you find that there were mines above Cañon Creek on the North Fork?

A. I did not make this examination myself.

Q. Did you stop, yourself, up at Gold Run? Or did you go higher up? A. I did not

Q. And so far as you know, do you know whether your assistant went further up than that

A. I dont believe that he did.

Q. Who had the direction of the observations that were made in respect to the sediment of the river?

A. I did

Q. You took charge of that yourself.

A. I paid a great deal more attention to that than to any other branch of the inquiry that was going on.

Q. Did you have assistance in the management of that matter?

A. I did have several assistants

Q. Who?

A. Mr Munson perhaps had more to do with that than any other one person.

Q. He was an assistant in your office at the time?

A. He was.

Q. And who else besides Mr Munson?.

A. A Mr Basqui of whom I spoke a while ago.

Q And both are gone now.

A. Yes Sir

Q. Mr Basqui is up on the East. A. Yes Sir.

Q. Mr Munson is still in your office

A. Mr Munson is not now in my employ

Q. Now you said that you would bring in Mr Basqui's report in the morning. Then we will leave that branch of the inquiry? The details of that report confirms the statements you have made here, practically?

A. So far as the total amount of material carried by the American River in suspension: And so far as the amount of material sent into the American River by the process of hydraulic mining. And the amount

of water used. They correspond with the statement here.

Q. The experiments which you made at that time were not only upon the American River but upon the Sacramento and other rivers?

Mr Hart. We object to that as not being proper cross-examination. That is a part of their case

Mr Belcher. I ask him that question now. He stated that he took deposits for analysis to Berkeley: that he took some hundred or more specimens. Of which ten or a dozen were from the American River. I want to know where the others came from

Mr Hart. That is not what he said.

The Court. Unless that assisted him in coming to this conclusion I dont see that it is a part of this examination.

Mr Belcher. Did that assist

you and others in Coming to the Conclusion at which you arrived?

Mr Hart. I object to the question unless it is made more definite.

The Court. I suppose the question is as to whether they assisted him to arrive at the Conclusions which he has stated here.

Mr Belcher Yes Sir

The Court. Answer that question.

Mr Hart. We have no objection to that

The Witness. They did not form any portion of the data or information upon which I estimated the total Amount of material Coming down the American River.

Mr Belcher. That is all; Unless I want to ask you some questions in Connection with that report.

Mr Hart. Mr Hall: where is the mine of the El Dorado Deep Gravel And Water Company?

A. I have already stated that it is in the neighborhood of Placerville. I am not prepared to say exactly in what locality it is.

Q. Will you say it is near Placerville

A. Yes Sir

Q. How far from the American River

A. My impression is that that mine stands back pretty far from the American River Canon proper. And probably it lies in a tributary canon: but I made no such examination as would enable me to state that positively

Q. Do you know where Weaver Creek is

A. No Sir. I know that there is such a creek there.

But I do not know it. exact locality.

Q. Is it north or south of Placerville

A. North or South (reflecting)

Q. Yes Sir

A. Do you mean Weaver Creek or the mine?

Q. The mine?

A. Well, I just drove through that Country once, nearly three years ago. Winding around Amongst the mountains. I think it lies to the South of Placerville. But I am not certain

Q. Between the time of going out this evening and the time when you came back to Court, endeavor to refresh your mind on that question? About the distance from the South fork of the American River to the El Dorado Deep Gravel Water and Mining Company.

Mr Cadwalader. We will

make an admission as to where it is, if they will take it.

Mr Stark. You say that that mine covers bio times the area of what, at the Gold Run Mine

A. The deep pit of the Indiana Hill claim

Q. How does it compare in area with the mine extending along the ridge? The entire ridge? The total working of the Gold Run ridge

A. My impression is that it is not near so large. But I made not even an eye measurement of it. I simply looked at it as I drove through

Q. How many places did you pass through in these mines where they had mined to the depth of 200 feet?

A. That is impossible for me to state. I saw banks there which I remember

were high banks. Have I made no study of the original topography or shape of the ground; no inspection that would enable me to judge as to how many places had been mined back 200 feet. But at Gold Run I did

Q. Did you notice whether the top of the mountain there had all been mined off?

A. Yes Sir, that is, the plain. The top of the mountain which you consider the cover, bear an area of 250 acres.

Mr Cadwalader. There is no mountain there?

The Witness. The work of that country is situated upon a distinctly different piece of topography from that of Gold Run. Gold Run is situated upon a ridge; with a high hill, to be sure, on one side. But while that was a ridge, the top had been cut off. In this other case, the mine is more on

the side of a hill: the slope of the country being one way And not two ways

Q. Do you think this mine when its entire Area will cover 250 Acres

A. Well that is my impression: that there had been mining done of there both superficial And deep to as great an Area as 250 Acres. But about half as great as that I saw at other places.

Q. About how deep did you notice that the mining was at an Average

A. Indeed I can not say.

Q. Did you notice any place where they had mined to a lesser extent than 200 feet

A. I certainly did.

Q. To how small an extent?

A. There were old remains of banks upon which not more than ten

in heights had been taken, Evidently over a considerable portion of the ground, the surface had been what you would call skimmed over. Commencing within ten or twelve feet in height and running out to maybe forty or fifty feet in height. The same appearance presents itself in all such mining ground.

Q. As to the area that had been mined in that way did it predominate? Was it greater or less, in its area than was the amount of mining you last described?

A. Well, I certainly cannot state

Q. You have no idea

A. I have no idea

Q. Where is Coon Hollow? You said you didn't see that!

A. I drove past Coon Hollow. I know it is on the drive from Placerville across towards Sierra Hill. I passed

through it on the drive. I can not locate it exactly

Q. How far is it from Placerville to Iowa Hill?

A. Fifty or sixty miles as I remember

Q. How far is Placerville from the South fork of the American

A. At least forty six miles. It sets back from the river. I know that.

Q. Five or six miles. A Yes sir.

Q. How far is it from the El Dorado Mine or Deep Gravel and Water Mining Company? How far from Placerville, if you know.

A. I do not know sir. I have no knowledge surely on that point. The object of this trip-if you will allow me to explain — was simply to find localities where there were well defined excavations or water consumed in excavations which I could get an account of. So that I

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Could send an assistant
there to make measurements
of them: to arrive at such
results as I gave awhile
ago. It had no other object
in view whatever:- other
than simply to satisfy my
own curiosity

Mr Hart, I will state your
honor that I think we will
shorten this examination by
an adjournment now

Adjourned until 9.30 o'clock
tomorrow morning.

In the Superior Court of the State of California in and for the County of Sacramento.

The People of the State of California
-vs-
The Gold Run Ditch and Mining Company

Thursday Decr 8th 1881. Morning Session.

Index.

Reported by
Winfield J Davis
Official Reporter.

In the Superior Court of the State of California in and for the County of Sacramento.

The People of the State of California vs. The Gold Run Ditch and Mining Company	Thursday Dec. 8th 1881 Morning Session

Testimony of W. H. Stall

<Resumed>

Mr Starr Q In your cross-examination yesterday you stated that you had had no experience as a mining engineer and did not consider yourself now to be a mining Engineer? A Yes sir.

Q State whether or not you wanted it to be understood as limiting your capacity to judge of water and its operation upon banks?

A I did not so want it understood in that way

Q What have you to say about that particular branch?

A With respect to the duty of water in hydraulic mining I have made something of a special study in this, that I have a number, I think 10 or 12 large pits measured and ascertained the water quantity used in washing them out and made a study so far as I could from inspection of the material so washed out and learned by inquiry the other circumstances attending the washing of them out

Q You say you have made a special study? A I have made a special study to that extent, furthermore I have acquired by inquiry and reading, all the information that I could get on the subject so that I have made

that a special study with
out being a mining Engineer

Q You also in your cross
examination divided the
bank of the Gold Run
mine into two parts, the
upper and the lower?

A I did yes sir.

Q Are those parts equal?

A yes. I so stated

Q Now in your estimate
of the height what point
did you go to, to the top of
the original ridge or to the
top of the rim of the pit
after the original ridge had
been partially washed off?

A To the top of the pit
only to the bed rock

Q Was your measurement
of the height of the pit
accurate, or a mere estimate?

A It was a mere estimate;
it depended entirely upon
a future survey to determine
the accuracy of it, that
is to say at the time I
originally made it I depended

upon a survey which was to be made then, to determine the exact height

Q Who was it that made the future survey?

A Mr Boschke who testified yesterday

Q Did Mr Lyons ky make a survey of it too? A Yes sir a short time ago

Q In speaking of the amount that is washed out from those two separate parts did you desire it to be understood that the amount of wash, or that the amount that the water would carry was regular at all times?

<Objected to as leading>

A As a matter of course taking the total volume arrived at and the ~~total~~ amount of water used, the result would be an average one, and not extreme one way or the other as to the duty of water. Waters may in the same mine and on

the same grade of sluice, wash out much more material at one time than another

Q Have you ever noticed any of the habits of the water and the washings of mines of that kind so that you can mention one or two? A I have noticed the washing of mines when there was so much material washed into the sluices and it became so thick that it became necessary to signal the men in the pit with the monitor or faint to send down clear water and stop washing in gravel for the reason that the flume or tunnel was becoming choked. At such times the water is carrying very much more than the average amount of material

Q Could you estimate how much more? A I never have made an estimate directly

on that but I know the volume is greatly in excess of the average obtained by such an instrument or measurement as we made, and such conditions might keep up for several hours or even a day to a less extreme extent

Q Explain to the Court the amount of material ordinarily washed by a miners inch in such a mine as the Gold Run having reference to such a material that is going down, whether light sediment sand or boulders, or boulders and sand and light sediment

A My answer will have to be as a matter of course largely a matter of opinion, founded on what I have observed in these experiments and not from absolute experiment in each instance That opinion would be, as I said Yesterday, that the

bottom half of the bank being worked, or that has been worked recently by the Indiana Still Company or the Gold Run Company would be washed out with a duty of about 2½ cubic yards to the 24-hour inch, that the top half would be washed out with a duty of between 5 and 6 cubic yards to the 24-hour inch and that the lightest material found there at Gold Run, although I do not think there is any of that appears in the pit that we have just referred to, the Indiana Still claim could be washed out with a duty of about 7 cubic yards to the 24 hour inch, and with a grade or on a grade of 6 or 7 inches to the 12 foot box

Q What effect upon the washing of sand would the presence of boulders in the flume have? As well as

A From the basin of the American river.

Q That is what I spoke of. A. They come from the natural hillsides, the hillsides as cultivated, the roads as ground up into dust by travel, the old mining excavations, where the surface is loosened or exposed without being protected by vegetation, and from the old mining dumps.

Q You include all those in natural washings?

A Yes sir.

Q Can you tell how much or approximate how much the natural washings are increased by the mining dumps and old mining claims? A No sir, I cannot. In making the estimate yesterday referred to, there was of course an allowance made for that purpose, but it was an allowance made entirely

small proportion of boulders and gravel will render the washing more easy than if it were pure sand, that is to say the stones bounding along through the flume will keep the sand stirred up and it will not settle down into as level and compact a mass on the bottom of the flume as it otherwise would

Q You spoke yesterday of surface washings, that is not surface washings but natural washings — when do those natural washings occur?

A Natural washings from the hills of course more particularly during the storms of Winter

Q Is there any considerable washing in the Summer time? A I should say not

Q Where do these washings come from, what you call the natural washings?

upon judgment and not upon any experiment, there was no experiment hardly possible in such case.

Q Can you state whether or not it increases the amount of the natural wash?

A It undoubtedly does, yes

Q Could you say slightly, or to a considerable extent?

A I could say that the old excavations and the old dumps taken together and the loosened ground the result of abandoned mining operations increased the natural washing to a considerable extent all taken together

Q Which has the greatest effect upon natural washing, roads and trails, or dumps and mining excavations?

A I could not answer that question sir. No data whatever available for any such calculation

Q Now you spoke yesterday

of a pasteboard upon which you put some tests of the American river or the American river basin?

Ayes sir

Q State whether or not those are the tests you made < referring to card of Samples > A There are 15 small bottles on this card that contain the specimens obtained by filtering water taken from the American river. There are some other bottles in the lower left hand corner that contain sediment from other streams. These from the American are those that I referred to yesterday

Q Those are all in the American basin are they — all these bottles come from the American basin?

Ans sir not all

Q Which then? A The 15 here represented come from the American basin.

Q Confine your testimony to the 15 taken from the American basin

A They are marked as to where they came from, each one.

Q The two small bottles next to you in the Scheme state where they came from. and at what time of the year and for what purpose?

A These were taken from the American river at a point four miles below Folsom

The Court Are they numbered

Ayes sir they are numbered 12 and 13. On December 28th 1878 they were taken under special instructions from me under the view of ascertaining how much sediment the waters of the river carried in suspension at that particular time of year when it was believed that mining operations were at a minimum, or in

a great measure ceased on account of lack of water.

Mr Hart When and where were the bottles numbered respectively 192, 193, 194, 195, 196, 197 taken

A They were taken from a point in the American river about half a mile above its mouth on May 21st 1879

Sample 192 was taken from the surface.
" 193 from mid depth
" 194 " near bottom
" 195 " the surface
" 196 " about mid depth
" 197 from near the bottom

Q Note what instrument did you take the samples at the bottom or near the bottom?

A They were taken with an instrument called a hydrophore.

Q Have you that here?

A I have.

2. Take that instrument and explain to the Court the process by which those samples were taken with it?

A The taking of samples from below the surface of water is very apt to lead to error. An instrument must be had that will obtain a sample of the water just as it runs without permitting of settlement in the charges, while the water does run, and therefore this experiment was used. It has not been used for some time and it is a little bit stiff. That instrument set in that way was covered by means of two small wire cables fastened at the extreme ends with a stiff wire, that was run through these holders such position that the axis of this cylinder was in a line with the current. So that the current flowed through the cylinder freely, just as it did on the outside, and when at a proper

distance below the surface, whether the bottom or mid-depth, it was desired to take the sample, the doors were loosened by pulling the cord here which resulted in cutting off a section of the water just as it flowed. Then the instrument was brought to the surface and on nearing the surface or coming just to the surface, it was tightened up by screwing these little screws here and the sample then lifted wholly from the water taken out and bottled in large fruit jars. I think that it gives a correct result whereas other instruments used sometimes do not. They generally show too much.

2. How did you take the samples from near the center?

A. Near mid-depth.

2. Yes sir.

A. With that instrument or one resembling it somewhat generally speaking though all

of the samples taken from
below the surface were with
that particular instrument?

2. How did you take your
samples from the surface?

A Ordinarily they were dip-
ped in the charges of the same
capacity as the bucket of simple
construction

2. Have you compared the tests
which you have made with
the tests of Mr. Allardt in
any case?

A Not in the case of the
American River

2 What is the name of the
test which you pursued the
wet or dry? A I never
used these express terms. You
mean in ascertained the amount
of material held in each sample

2 Yes sir. A. With these
samples here on the card the
filtering process was used
and I might with propriety
I think call that a dry
process, although I never used
that term

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Q. Did you ever make tests with a tube like that (referring)? A. We had some bottles, any bottles used I think by Chemists with a perfectly flat bottom and about Eight inches in deepth, that resembles this tube that we used in comparing the water taken at different times with the water taken at the special times when these samples were obtained

Q. How did the tests with the tubes compare with the other tests? A. Where the water carried a sediment composed largely of sand or distinctly granulated particles they settle- that is the sediment settle rapidly and completely in the tube or bottle and in that event the comparison with the results obtained by the filtering process will be quite close. Where the water however carry a good deal of clay particles they will settle apparently complete and firm at first but

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upon being allowed to stand some considerable time, they will shrink as it were and get into a considerably reduced space, so that it is always safe in preparing the sediments employed largely of clay to allow them to stand sometime, a week.

Q. And after they have set a week? A. Then there shrinkage is quite slow

Q. Well, did you test it in that way? A. Oh! We had them stand for sometimes several months - the fact is there is some water standing in the office there now that were taken a year or two ago, but not in these small bottles, but the way.

Q. Now after allowing your tests in the tubes or the bottles to stand for several weeks or several months as you did, how did you find it to compare did you say with the other test, the filtering test?

A. I do not remember exactly

293

Now but it is my judgment that a material or sediment composed largely of sand and standing in a settling tube of this kind for several days will give a result with ten or fifteen per cent of a result obtained by filtering. With the sediment composed of clay particles I showed let them stand well on to a month to make the comparision, and get equally close results. I would say this: That with the clay sediments, the sediment of course or the rate of sediment is less all the time from the commencement to the end of their shrinkage.

2. How is that?

A The settlement in the clay sediments, is at a less rate of progression each day from the commencement to the end of the time of their shrinkage

2. Which did you find to show the greater proportion, if you did find, and recollect by your experiments, that is, which

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did you find to show the great-
er proportion, those that were
made in the tube or the filtering
test? A. Well, as I have
just explained.

Q. You said there would be
15 percent. difference, on which
side? A. I said there
might be as much as 10 or 15
per cent difference. The differ-
ence would always be in favor
of the Experiments by the tube
process, that would always give
a little more than the other
when reduced to a perfectly
dry state

The Court. These are comparisons
of bulk and not of weight

A. Of bulk altogether, yes sir.
These samples were never made
(tube) and those were (bottles)

Mr. Hart. State whether that
same difference would exist
between the channel of a river and
the dry particles of sediment
on the side of the river in
measuring the fill in the water
channel, or the obstruction of

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the channel itself

A. I must confess that I do not exactly understand that question

Q. Well, I will explain now as nearly as I can. There is a difference of 10 or 15 per cent as I understand you to say, between this when it is reduced to dry ~~latitude~~ and that when it is left in the water

A Yes sir

Q. Can you whether that same difference would exist, between the same amount deposited on the banks of a stream where it comes be dry, and placed in the bed of the river where it comes be wet?

A Yes, I should consider it would, to at least that difference

Q Well now owned the obstruction & the channel be in the same proportion to the amount and volume of particles when dry or the amount of the particles when wet as in the tube there, that is what I am trying to

X296

set at ?. A. Sand when deposited by running water, put in position by running water might take a more compact form than when allowed simply to settle in still water like this.
The action of the water settles down each particle and places it in a hollow of there is one there to receive it, so that the difference might not be quite so great

Q In the Case of sand?
A. In the Case of sand.
In the Case of mud I should say it would be equally great, as a matter of Course mud is only deposited in running water where the Current is very slow
Q State whether or not on that the Card that you have there or any marks designating the amount or proportion of deposit in the water in each Case where the test was made and the place where the test was made.
Mr W. C. Belcher I object to that as leading
Mr Starr I ask you to state whether the Card shows the place where each of those deposits were taken from and the proportionate amount of sediment in the water at each place and time—
I ask it in that form

Now
The Court What does the
Card indicate as to locality
from which they were taken
Mr Hart state what the
Card states in relation to
the bottles about which you
have testified where the
tests have been made in
the American River?
A. With respect to the
fifteen Samples taken from
the waters of the American
River the Card purports
to show in each bottle
the amount of material
Contained in the twentieth
part of a Cubic foot of
the Sample taken and
the And the amount by
Weight and by Volum
Marked Underneath of each
Sample
Q Does it show the
proportion Near the Centre
of Sand and Sediment to
Water.
A. The proportion of the

Whole as to the Volumn
of Water ? A. Yes sir
Mr Cadwallader as Well as
by pounds — as well as by
weight ? A. Volum as
well as by weight.
Q But the Volum is by
the dry process ?
A. All is

Cross Examination
of
H. H. Hall

Mr Belcher

You read somewhat
from your reports yesterday
as to figures will you
now read so much of
that report or from your
report what is said in
regard to the sediment
Carried in suspension by
the American River.

Mr Starr He did not read
from his report.

A. I referred to my report
to refresh my memory
Concerning Certain figures

Mr Belcher Will you again refresh your memory by reading that portion
Mr Hart I object to it, he has a right to ask him any question and he can refresh his memory if he wants to
Mr Belcher I desire to have the witness do so, I have asked the question and I desire insist upon it
Mr Hart I object to his reading from his report I do not object to his testifying to any matter that he may have testified to yesterday and refreshing his memory from his report if he desires
The Court There seems to be a dispute as to the mode of getting at it
Mr Belcher When a witness is called to testify and he uses something to refresh his memory as he has a right to and

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We did not object to that-
I now simply call for the
reading of all that portion
and it is but a single
paragraph
The Court I suppose that
you can get it in. It
is only a question as to
the mode; you can read
it and ask him if you
did not find that on the
same paper.
Mr Belcher Yes sir I can
read it and ask him if
that is the whole of it
Or ask him to read it-
have you your report?
A. I have a copy of it
Q. Will you turn to it
Mr Hart To read what I
want to know what it
is - I insist that I am
entitled to a little courtesy
from the attorney on the
other side, I want to
know what Mr Belcher
is asking him to read
The Court There is nothing

practical about this dis-
cussion because in Cross
examination the Attorney
Can read it himself
there is no doubt he
Can get it in one way or
the other.

Mr Hart I have no ob-
jection to this going in
but I do not want this
whole report read.

(The witness) I think that
Chapter Contains all this
is part third of the report
made to the legislature
in January 1880

The Court Do I understand
that the entire report is
submitted to the Court or
not

Mr Belcher We are willing
that the entire report
shall be submitted to the
Court

The Court Without reading
it-

Mr Hart there are many
matters of opinion in

8303

that report that would not be proper in evidence in this Case, they would simply Cumber the record, as referring to Yuba and Feather and other Rivers we did not Care anything about putting into our Case We did not desire to extend this examination to go to other Rivers

The Court It will not go in if there is objection

Mr Belcher I propose to read from page 30 and 31 of the report

Mr Hart I propose that you read such portions as the Witness used yesterday to refresh his memory.

Mr Cadwallader That if the Court should Consider that it would be enlightened by information upon the Amount of mining debris and earth deposited by natural wash in the

X304

Sacramento the Feather and
the Yuba and the Bear
And the American River
basin, that this report
Covers all of that ground
The Court The immediate
Course here would be
whether it effects the
Sacramento. American
Mr Hart We expect when
we get through that
they will introduce some
testimony with respect to
the wash of the Feather
And the Yuba River
which we will desire to
rebut
The Court That is a matter
of discretion You will be
Considered as not being
put in the affirmative,
that so far as this proof
is Considered it will not
have any bearing upon
your right to rebut-
Mr Hart It will be
Considered that in our
Case we did not open up

4305

the question as to the Yuba and Feather Rivers
The Court So as to prevent your putting in evidence in rebuttal
Mr Hart So that we are not upon the affirmative of that question but upon the negative
The Court You do not Waive your Objections and this particular piece of evidence will not prevent you putting in your rebuttal
Mr Hart I object to Counsel reading the report on the ground that it is incompetent as evidence and furthermore that embraces subjects which do not relate to the matter of the Examination in Chief and therefore would not be proper Cross Examination.
The Court I can hardly tell whether it refers to the subject or not until I hear it.

Mr Hart I will take an
Ex exceptim.
. The Court Of Course I
suppose you can only
read as to the subject
upon which he repeshed
his memory
Mr Belcher I propose to
read to the Court first
and not to the witness
what I propose to ask
the witness about
Mr Hart This is not to be
taken by the reporter
Mr Belcher I think it is
The Court I will let him
read it
& Mr Hart Note an Exception
Mr Belcher Reads as follows
Taking the Volume of
material carried by the upp-
er Sacramento as a guide,
I am enabled to Judge some-
what of the Amount washed
Off from lands by natural
action, Then with drainage
Areas Considered, and a
liberal allowance for wash

from old Mining dumps
And deposits, from heavily
Cut roads, Etc., I am,
enabled, In the Case of the
Feather and the American,
to Estimate upon the portion
of their Sediments in Susp-
ension due to similar Causes-
the natural washing from lands.
The following Exhibit gives the
result; Upper Sacramento River
Natural wash 2,100,000
Cubic Yards, Wash from Mines
Feather and tributaries
1,600,000 Cubic Yards Natural
Wash, Wash from Mines —
9,700,000 Cubic Yards, The
American River Natural Wash
1,000,000 Cubic Yards, Wash
from Mines 3,500,000 Cubic
Yards, Total Cubic yards,
Natural wash 4,900,000,
Total Cubic Yards Wash from
Mines 13,200,000,
To Recapitulate; there Were in
the past year 18,100,000
Cubic yards of material
brought down the Sacramento

1308

Valley in Suspension by the river waters, Of this 4,900,000 Cubic yards was due to Natural Wash, And 13,200,000 Yards directly to Mining Operations. & the Whole, 2,100,000 escaped into Or settled ~~into~~ in the basins, And 16,000,000 Cubic yards were Carried in the waters of the main River past Sacramento.

Proportions of Mining Sediments Suspended.

From the foregoing, it may be seen that 40,564,000 Cubic yards of material were put into the Feather River and its main tributaries, by the Hydraulic Mining process during the past year; And I have estimated that 9,700,000 Cubic yards of this passed Out in Suspension — About 24 per Cent, Also that 8,604,000 Cubic yards of Material Were put into the American River Cañons; And I

Have estimated that 3,500,000 Cubic yards of this amount were Carried our in suspension - about 40 per Cent. The first result is in every way satisfactory, and about what might well be expected. The second requires some explanation. It will be noticed that a Comparatively large allowance has been made for the Natural wash from the American River Mountain Watershed. This has been done because there is a much greater area of Cultivated ground there than in any of the basins tributary to the Rivers further North And because the surface is in a great part a red soil easily washed, and furthermore, the large number of old abandoned mines along the rivers bluffs And banks furnish a Great quantity of very fine Sedimentary wash

With every heavy storm, which has no parallel in the other regions with which it is compared, and the whole Country moreover is more cut up with roads and paths, where dust is formed to be washed down in Winter. So much for the Natural wash.

Mr Cadwallader I want the next paragraph read—

Mr Cadwalader [Reading]

The materials put into the American River are of a lighter nature, Contain more top soil on the average than those of the Feather, Yuba, Bear, or any other Stream being now Considered. At some points almost the entire Washing Sometimes is in the red soil, which all goes off in Suspension. At other points where the Material is heavier, the great fall which it has into the deep Canons and

the immense pulverizing power of the floods there, grind it to the finest atoms, and thus it is carried up in the waters. The fine character of the material washed in the River is shown to a degree by the extraordinarily high duty which the water performs — 4½ Cubic yards to the 24-hour inch, on the average, as against 3 and 3½ Cubic yards in other Quarters.

The Court. Now if the witness desires to explain that he can do so. I do not know whether it is claimed to be inconsistent with his testimony, or not

Mr. Belcher Nosir, I think not. I think it is consistent

The Court. If you desire to explain it Mr Hall, you can

Mr. Hart. We desire to object before any testimony is taken to the examination of this witness as to any portion of that report excepting that portion which relates to the American River and American basin

The Court. Unless there is an attack made upon his competency I suppose it is it must be confined to the American River

Mr. Hart. We here now, in connection with this exception, expressly disclaim any desire on our part, or any intention on our part to introduce any proof that will open up the question as to the amount of

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debris brought down the D'Ealbay, the Yuba, and the Upper Sacramento River

The Court. [after argument] So far as going into the investigation now, of the amount of matter carried in other rivers, I think the objection is a good one, but if it involves however a determination of the competency of the Expert, or if it is for the purpose of showing the basis of his computation here, it may be legitimate in this cross-examination, the effect however so far as possible to be confined to that one purpose and not coming into the case as evidence generally, but only on that one proposition. I suppose if those rivers be legitimate they can not be excluded because they may be competent testimony for defense in other parts of the case. Of course it will not change the aspect of the case before the Court. It will not make the Plaintiff

responsible for the proof coming in now & prevent them from taking the position that they have the right to give rebutting testimony, when the Defendant case is opened. But I think it would be Exceedingly dangerous, to prevent them from showing the basis of this Conclusion, & of their Experience in other rivers because it might be also Evidence in the defense

Mr Hart. I think they can show of his Experience and the basis of his opinion but I do not think that involves the introduction of his reports or an Examination as to the result of the amount coming down other rivers

Mr. Bleicher What is the Extent of the drainage area of the American

Mr. Cadwalader He say 1300 Square miles

The Court. You have already been over that.

Mr Hart. The witness has been

Croß-Examined and has been turned over to him as to Everything Excepting that which has been brought out in re-Examination. Now I understand that Mr re-croß should be confined to matter brought out

Mr. Belcher Were you asked and did you answer as to the Extent of that basin yesterday, the drainage area?

A I remember being asked about the Character of it. I do not remember of stating the area, although I might have done so

Mr. Hunt. I will withdraw my objection, but I will object to a long Examination

Mr. Belcher I do not think it will take very long

The Court. Ask him about the area of the country drained by the American?

A. 1889 Square miles as near as we can make it out from the best maps that are Compiled

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Mr. Belcher Does that mean its discharge at Folsom or its discharge at Sacramento?

A It means its drainage area within the mountains and foothills at a point somewhat below Folsom

Q. How much below?

A. Well, I can not say but within a few miles, two or three miles

Q What is the total drainage area of the American if you know? A. Including the plains?

Q. Including the plains.

A I have not the information at hand to estimate that

Q. Did you estimate that in your report here. See if you did? A. In figuring on the amount of sediment washed off of that drainage area, I did not

Q. Well have you a statement there — if you have it it simply now to get at the extent of it?

A. I do not think there is any statement of the drainage area, of any of these streams referred to in these tables given in connection with the statement of the amount of material washed from them.

Q. Have you in your office data for the determination of the extent of the drainage area of the American?

A. I have maps that represent the whole state.

Q. And show what?

A. And show the extent of the drainage area of the American River amongst others.

Q. From that then you could give at least an approximate estimate of the extent of that area?

Mr. Cadwalader. I suppose he may go into that far enough. We object to its going any further.

The Court. If the objection is now interposed it will raise the whole question again. I suppose it is not strictly cross-

Examination

Mr. Belcher Yu estimate then 1889 square miles ci simply the Mountain Basin?

A The mountain and the foot hill portion of the basin repre-senting a I suppose that portion of territory from which water drains with sufficient velocity into the American river to wash sediment into it.

2. And when yu speak of sediment, do yu mean mining sediment, or any sediment?

A. All sediment

2. Now are the statements that I have read or which have been read to yu from this report correct according to yu best judgment now

Mr Hart. I abject to a verification of any portion of that report Excepting that which refers to the questions about which the witness has been examined in Chief, that is the American river and its branches

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The Court. You mean in regard to the American river?

Mr Hart Yes sir

Mr. Belcher So far then I will limit it so far as they relate to the American river, directly or indirectly.

A. I never have had any definite or substantial reason to change my estimate of quantities washed down and of the statements made in that report since the record was made, not having had any such experience as would enable me to change the opinion, so that the changed opinion would be valuable. I must say that my best judgment is that those figures are as near right as they could have been made

2. Not only is it also true in regard to the statements

that are here made with
respects to the American River
directly and indirectly, that
those are also equally
true according to your best
judgment now?

Mr. Grant. Those statements
that I have heard read are
all direct statements. I do
not know what he means
by directly and indirectly

The Court. I suppose he
refers to them all so as
to take them all in - all
that refer to the American
River.

A. Will you allow me to glance
over this portion of the report.
Having once made this report
I have not had the vanity
to read it very much since

The Court. That only includes
that part which was read

The Witness. I presume you
mean by the statements the
opinions expressed

Mr Belcher All that is there expressed in regard to the river.

A With respect to the figures I have already stated that I have seen no reason to change my mind. I have no definite reason. Now with respect to the opinion expressed I will say that I have seen and know of no reason why why I should change my opinion - I think just as I did then

Q This 1889 square miles is principally in what Counties? A In El Dorado and Placer and I think also there is a little corner of Alpine County included

Q Have you either from your examination or from reports returned to your office or maps there filed, determined, or can you determine the approximate area of ground cultivated

in El Dorado County within the drainage area of the American river?

Mr Leadwalader. We object to that as not cross examination. Let him call the gentleman at the proper time as his own Witness.

The Court. I think it would have been proper yesterday had you gone into it. I think I will allow it now.

A. I have no means acquired by my own work of estimating the amount of land cultivated in El Dorado County other than the observations I made in the two trips made through that County. Outside of that however I made diligent enquiry of those I believed to be acquainted with the territory and I examined the Surveyor Generals Reports which gave the area of county cultivated in different crops in the

825

different Counties in the State

The Court You wish only the portion of the County drained by the American?

Mr Belches That is all. From the best information then that you have what do you say is the area in that County in cultivation within the drainage area of the American?

A There no means of telling it without referring to figures or memoranda

Q Will you after you leave the stand refer to those figures so that you may be able to answer the question?

A I will

Q Have you made any computation of the areas in cultivation in the County of Placer within the drainage area of the American?

A Only in the same manner as that described in the County of El Dorado.

Q Will you also make the same memorandum in regard to Placer County? A Yes sir.

Q Now coming into Sacramento County how much of a drainage area is within the drainage area of the American River?

A A very small portion I can just remember how the map looks, but it is quite a small portion. that is to say within the mountain drainage area?

Q I am talking not of the mountain now I am talking of the lower?

A The whole drainage area?

Q Yes A well there is a large portion of Sacramento County within the Valley drainage area of the American Sacramento River

Q That is what I want to get at, the valley area, the drainage area where the waters and everything naturally flowed towards and into the American river

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A No sir they do not There is a small portion of the balance of Sacramento County the waters that fall upon which drained into the American river you can then tell us approximately what that portion is? A I guess by an examination into the map

Q Very well make an examination with respect to Sacramento County as well so that we may have the entire drainage area so far at least as you can approximate it, of the river

A Yes sir

Mr Wadsworth As a part of your case

Mr Belcher Q In the measurement which you made at the mine, or caused rather to be made, for you made none I think, yourself, Mr Boschke made his measurements at what time?

A In September 1879 or

August 1879

Q August or September?

Ayes sir

Q And then you were asked if Wolynusky also made measurements there and I think you said he did?

Ayes sir

Q Did you send him there to correct Boschke's measurements? A I sent him to measure the extent of the Indiana Still pit at the present time not with a view of correcting Mr Boschke's measurements

Q What time did he go there? A He went there several weeks ago, three or four weeks ago

Q In November of this current year? Ayes sir

Q And when was Mr Boschke there? A In August of 1879

Q You spoke about excessive discharges of material from the sluices

occasionally rendering it necessary to stop? Ayes sir

Q The sediment from ~~the~~ coming in or the material from the mine and putting on water? Ayes sir.

Q Now does not the overburdening of sluices with mining material of material from the mine result from blocking it up and stopping?

A Certainly it does, otherwise they would not stop, otherwise they would not pump for clear water

Q Then is ~~it~~ not the evidence of such overcharge of a sluice always made apparent by the consequent stoppage of the material escaping from the end of the sluice? A When the course of events has reached an extreme point, yes

Q Now is it not true also that those stoppages are always caused by some large rock

getting fast and stopping it, is not that the cause and not that there is so much more material than the water can carry? A I do not know that it is sir

Q Do you know that it is not? A I do not know that it is not, but it is my opinion that it is not

Q It is your opinion that it is not? A Yes sir

Q Now have you had sufficient experience about those mining sluices to make your opinion as good as that of a miner? A I have not

Q Now those samples which you have there, I think they are numbered, and certain labels attached to them or over them, certain marks made with respect to them, two of them were taken in 1878 were they? A I read the date. There are two here marked "December 28th 1878" It seems to

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me that must be a mistake, that that ought to be 1879. I can tell by referring to the record

Q Which you have of that in the office? A Yes sir

Q I wish you would make that reference so that we may know whether it was 1878 or 1879? A Yes sir. If you will allow me I would like to make a memorandum of those references. It is getting a little to burdensome on the mind

Q Now the memorandum that you made was to enquire as to those two specimens which you have there in the extreme left? A To enquire as to the dates of these two specimens and as to the mountain drainage area and as to the valley drainage area. of the American as to the area cultivated in each of the Counties within

the drainage area of the American

Q I will ask about those two when you return with the data. The others were taken, I think you had 15 in all, that leaves 13 taking off the two at the extreme left? A Yes sir.

Q When were those 13 taken? A Those already given the time of taking the next six

Q The six were taken at what date? A May 21 1879

Q Did you take them yourself? A It is my impression that I took those samples myself

Q These six? A Yes sir I remember taking samples in the mouth of the American rivers myself.

Q And then assuming that your recollection is correct as to that being the 21st of May 1879 I'm took those six samples

near the mouth of the American
river about a half a mile
up? Ayes sir

Q Between the first three
and the second three how
long a time intervened?

A They were taken all on
the same day May 21st 1879
according to this card which
I believe is correct.

Q How long a time intervened
between taking the first three,
one at the top, one centrally,
and one at the bottom and
the next three in the same order

A Oh they were taken all
consecutively and probably they
were all taken within an hour
& within two hours. They were
not however taken in the same
portion of the cross section
of the river. There was
one set taken at the
middle of the river and
another set taken nearer
the bank

2. One set in the middle of the river, and one set in the bank?

A. That is my recollection.

2. Which set in the middle, and which near the bank, giving the numbers there? A. There is no memorandum on this card.

2. Have you any recollection in regard to it?

A. I have no recollection. I simply remember the fact.

2. What was the stage of water in the river, at the time those were taken?

A. It was, as I remember, a falling stage of the water. There had been floods, and the water was falling.

2. Have you any recollection, or have you any memoranda, that will show the stage of the water, at the time those were taken?

A. I have memoranda.

2. Will you also examine

that memoranda, so that we may know the stage of the water? A. Yes sir

2. When were the next taken? A. According to this card on July 14th 1879.

2. Where? A. At the same point where the preceding set were taken

2. How many were taken then? A. Three

Mr Cadwalader What point is that? A. A point about a half a mile above the mouth of the American River

Mr Belcher Were those taken in the center or at the margin? A. Presumably taken at the center.

2. Did you take them yourself? A. I was present at the taking of only one set of samples in the mouth of the river. I think it is the section that we have referred to. In that event I was not present at the

other time

2. Then it is a mere presumption matter of ~~afford~~ where they were taken, when they centrally or otherwise

A. No, because it was the understanding, or at least it was my instruction always that the principal samples should be taken from about the middle of the stream

2. But you do not know of your own knowledge?

A. Of my own knowledge, I do not know.

2. From what portion they were taken? A. No sir.

2. When were the next taken? But before you answer that I will ask you how you know about the amount of water flowing into the American at the time these were taken

A. Not at my present recollection, but I have some memoranda that

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would furnish it

2. After making the examination as you do, of your records, make that further examination. Now the next set were taken when?

A. On January 24th

2. 1880? A The card does not state. It must have been in 1879—no it must have been 1880.

2. Your records will show exactly when that was taken? A. They will, yes sir

2. You took only the one that was the first there three or six taken at this time? A. two only.

2. From the center or bottom?

A. One from the surface, and one from the bottom that is to say there are but 2 specimens preserved here. There may have been at each of these times a number of bottles filled

2. Well do you know

whether they were or not?

A. Of my own knowledge I do not know, but I believe there was. There are only 2 samples preserved, and there were only 2 that were filtered, because all that were filtered, were preserved.

Q. Here then, we have 2, when were the next taken? A. February 23, 1879.

Q. Is it 1879 or 1880?

A. It is marked 1879 here.

Q. Then the other, January 24th was probably 1879, if that is so? A. Yes sir, it was.

Q. Your records will show however about that exactly? A. Yes sir

Q. How many then?

A. Two. Both of them from the surface

Q. Both from the surface?

A. Yes sir

Q. Do you know the stage of water, or how much water was flowing in

the American at either of these two? A. I can tell by referring to the records.

Q. Are your records cumbersome, or would they be in small compass, so that you could readily bring them here? A. For this special purpose of telling how much water was flowing, I could easily tell. I believe that has been printed in the report you read from a few minutes ago — the volume of water flowing at the time each one of these samples were taken, in a table

Q. Well, now you can refer to that afterward when you leave the stand, so that coming back again you can answer these questions very briefly? A. Yes sir

Q. So as to know the depth of the water at the time when these were taken, where they were

taken, the amount of water flowing, and that, of course, would show the stage of the water

Mr Cadwalader. And the instrument used.

Mr Belcher. He has already stated what instruments were used

2. These samples, were all, if I understand you, from the mouth or near the mouth of the American, except the two first-named?

A. Yes, sir

2. There will be several questions that I desire to ask you in regard to that matter, when I come to it. Now, the bank of the Gold Run Mine, that is, The Indiana Hill Mine, you have spoken of as being divided into 2 parts or strata, the upper and the lower, each occupying about one-half of the perpendicular

elevation? A. Yes, sir.

Q Did you make a sufficient examination of that claim at that time to be able to form what would be in your own mind a correct judgment in regard to the character?

A. In regard to the geological character of the material

Q. In your redirect Examination you were asked about the material above and below, the lower half as I understood you to say, then, was hard material which water would wash about two and a half yards per inch

The Court. He stated that in Cross-Examination yesterday Mr. Belcher and as to the upper portion which was also about one half, that it was softer material, and that more cars would be washed. Now it is simply in regard to that Examination to know if your Examination of the dam when you were there was a sufficiently careful one that you could rely on your own judgment in respect to the character of the upper and lower strata

A. Is that the question?

Q. That is the question

A. With respect to the facility with which the material in the respective strata could be

moved ?.

2 Exactly. A. I was in that claim several times and looked at the material composing the walls of the pit and conversed with - & am not certain whether it was the Superintendent or the Foreman then, but at any rate it was somebody who was in the habit of working in that claim and an intelligent person and made up my mind from this inspection merely that the lower portion of that material would resist the action of the water in disintegrating it after it had been blown down, resist the washing away, the effect of the water twice as much as that which was up above, or more. Then from the results of these surveys that were made and the examination of the kind of material in the upper workings about, I have since made up my mind & the effect that I satisfied

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to yesterday, as to the comparative duty of the water in the lower stratum of all the deposit in the middle stratum which is really the upper portion of the deep workings, and in the upper stratum which is the red surface material?

A. I do not consider that my judgment in that matter in respect to that Special Claim comes as good as that of somebody who had worked there in that claim for months back, but I do consider that for general purposes it is a pretty good judgment.

Q. Is the lower stratum hard cement? A. Not all of it. My recollection is that the very hard cement material was confined to the lower 10 feet. I know there was a portion of the lowest part of the deposit that was left not washed away and I was

informed that it was so hard that they intended to mill it.

Q They could not wash it at all? A Yes. That was only a thin portion of 4, 5 or 6 feet so that the material gradually grows harder as you go down. I have simply averaged the lower half of that which they worked

Q Did that include these 4, 5 or 6 feet at the bottom?

A That includes these 4, 5 or 6 feet at the bottom

Q Do not the lower portion still not including these 4, 5 or 6 feet in the bottom pretty nearly as hard as sandstone rock? A I know that that at the bottom resisted a pick pretty well

Q They could not pick it at all? A Practically not That portion which was left was pointed out to me as being so exceedingly

firmly cemented that it could not be washed.

Q Now speaking of drainage, natural washings, Mr. ... report states that the soil for the most part within the drainage area of the Amer... is a light red soil?

A I believe it does

Q What effect upon such soils and upon all soils of light characters will be produced by the pasturage of animals on the hillsides and even in the valleys?

A well the effect of the trapping by the hoofs of animals in considerable numbers over a hillside composed of a loose soil will be of course to destroy its power of cohesion of the particles and admit of its being washed away easier by the effect of storm waters, and the pulling of the roots up. The roots of grass by the teeth of

animals in browsing will have the same effect.

Q Where sheep are pastured and animals are pastured do they move around the inclines of hills - the sharp inclines generally so as to make paths all along and around such places? A Of course I have observed that mostly in the pasturing of sheep on hillsides that they do make their little trails running around on gentler grades from point to point probably.

Q Is the same true of cattle? Ans, cattle do not follow in trail nearly as much as sheep while of course they make trails, they are very much fewer in number.

Q Now what effect has the pasturage of animals, sheep and cattle upon hilly lands, what effect does it have on the amount

of sediment that would be carried off? A In general terms I will state what I did awhile ago, that the effect would be to produce a condition of things in the surface of the ground which would admit of a greater portion of the soil being washed away by the rain fall

Q And you have already stated as to roads that they had that effect Now you state in your report —

Mr Caldwell (atty) No, he did not say that all roads had that effect

Mr W. C Belcher Q What did you say in regard to roads Mr Stull?

A Generally roads have that effect. I can conceive of a road that would be built through the country the surface of which

would be readily washed under the action of rain storms whereas the surface of the road would be more compact than that of the general surface of the county and would not be washed to such a great extent but the reverse is a general rule

Q That is not the rule with respect to all the roads which you have seen within the watershed of the American in the hill portions?

A I cannot say that it is but my general impression of the roads through the foot hills and mountains East of the Sacramento Valley including the drainage area of the American is to that effect

Q Now what do you say as to the effect of the plowing and cultivation of lands and particularly those that are in a hilly

section? A The cultivation of the land produces a state of the surface which admits of a greater portion of the soil being washed away by the running waters

Q You speak of mining dumps in your report — in your report that I read to you — Here you speak of mining dumps and the bars along the river side where mining had been abandoned. Did you there include any thing beyond the old surface mining — what we could strictly call Placer mining? A Did I refer to anything else?

Q Did you include or refer to those — I will use the word refer?

A I referred to the remains of mining operations in the forms of piles of dirt and dumps proper as I understood it and side hill fillings and all

classes of mining that have been abandoned in contra-distinction to the dumps or material being placed in there by the hydraulic mining process going on there at the time when this estimate was made

Mr Wadsworth. That would be from all natural causes?

Ayes.

Mr Belcher. Did you include in that estimate the dumps in the river or in any of its tributaries?

A Of course I included all such dumps. In explanation though —

Q Why? Did you include the dumps in your estimate of natural washings or did you include those in mining operations?

Mr Stuart. Which do you refer to, the old or the new?

Mr Wadsworth. The attrition of the old dumps I suppose

Q The washings spoken of as natural washings were estimated as coming from all sources except the mines being worked

Q Did you include the dumps that were on the Dow & Hill claims? The amount deposited by them in former years?

A There was no estimate made of the extent of dumpage ground of any specific mine

Q Did you include or estimate — included in your estimate the dumps from the mines along the river from Sacramento to Folsom? A What was included in the general names I have described

Q What estimate did you make for those mines?

A For the mines bordering on the bank of the river or for the amount of material washed from their dumps?

Q Now you make your estimate of the amount of washings that come from natural causes. What did you allow if you have made any separate allowances for them — for the mines along the banks of the American between Sacramento and Folsom? A There was no separate allowance made for that

Q This allowance for natural washing is simply of what was coming down every winter from what was left there if I understand you correctly?

A Yes it might be expressed that way. I think I have said substantially that

Q Now I want to call your attention to a particular fact. Suppose here at any one claim or bar for instance or a placer claim back

some distance on any of the tributaries of the rivers, five acres had been washed out at that time to a depth we will suppose of 10 feet and for our present purpose we will suppose that the heavy gravel and cobbles were all taken out from the sluices and left on the ground. Now take that and suppose that five acres had been washed. Does that estimate there mean to include simply what effect the rain coming down upon those five acres would take off with it and carry into the river? Is that what you mean by natural washings and I wish you would answer that question directly? A That would be one form of natural washing.

Q What would be another form? A Another form would be the accumulation

of water in such an old mining excavation as you speak of that had fallen on the surface of the ground perhaps above and run down into it and had not fallen upon the excavation proper

Q And that water would take up and carry off some material of its own nature? A Yes.

Q In those mines, mines of that character were they usually, so far as your observation goes, washed to the bed rock?

A My observation is not worth much on that point. My impression — I have an impression —

Q Why? Very well we will have your impression

A My impression is that the old bank washings are not to the bed rock, but I know for instance that the bed rock in the neighborhood

of Folsom is 'way below the river

Q There they have not got to the bed rock?

A There they have not got to the bed rock

Q When they do wash to the bed rock and leave these piles of cobbles and heavy rock, is there much left for the rains or the accumulation of water which will come in from the country around into the hole that is there made to carry off? A There is a good deal left in the surface soil that is around the rims of these washings that comes down or is washed down after and I think it is picked up and washed away but in mining excavations of the material that was handled for mining purposes my observation is that there is not a great deal to be moved

Q Very nearly all of it was removed by the mining operations that were carried on there years ago?

A Those old workings were generally cleaned up pretty well with the exception of the piles of boulders and cobbles that were left in them?

Q They were pretty well cleaned up of everything that would be included under the head of natural drainage? A No, not entirely so because where there was a slope on the bottom of such old workings as you refer to the action of the rains has cut out gullies just like the marks of an enormous rake running cross ways. I take it that those have been produced by the rain waters running across such places since they have been abandoned

Q Now you have spoken of

gullies, what effect does the cutting off of timber have in respect to this very matter of gullying?

Well that is a matter of what might be called scientific opinion

Very well you are a scientific man and we would like your opinion

A It is generally conceded by those who have made a study of this subject that the removal of timber has the effect of admitting the washing away of the surface soil in some instances to a very great extent.

Mr Cadwalader Is that so where it is followed by undergrowth immediately?

Ans Sir. It would not be so in the valley or on the low land on this side and there might be many exceptions

Mr W. C. Belcher Q In your examination within the

water shed of the American have you frequently noticed or at all noticed where deep gullies have been cut into the hill sides by the action of water within any comparatively recent period say within 10, 15 or 20 years. A I have noticed many such places in the mountains and I think I may say that I have noticed many such places in the American river basin but I never made a note as to the locality of any one of them

Q Or the extent of the material removed? Ans sir that was considerable

Mr Hart In the American river basin? Ans sir I have never noticed generally such appearances

Mr W C Belcher Q Have you noticed within that basin land slides?

A my attention was directed

to one slide. I might have seen many without remembering them but I remember that one It was in the neighborhood of Michigan Bluffs I think It was a large land slide that the Superintendent of one of those mines directed my attention to.

Q Does the cutting off of timber have any influence upon land slides as producing them or inducing them?

A It is a generally accepted opinion among engineers that it does have that effect

Q That is whenever you take away the support to the earth which is given by the roots of trees it gives effect to the action of the water or drift and the earth gives way?

A That is the accepted opinion

Q What is the effect of snow slides? And are

those are uncommon thing within the water shed of the American?

A I never have been within the heavy snow line in the basin of the American rives

Q Do that you could not tell about that? A So that I could not tell about that

Q The American rives however rises in the high Sierras a long way above the snow belt does it not? A yes certainly

Q Is the effect of these snow slides the same or comparatively the same as that of glaciers, a kind of glacier action?

A I never have noticed myself, a snow slide, but I have seen the results of such slides on the line of the railway the Central Pacific Railway, in going over the mountains and there it has such an

effect

Mr Belcher In regard to the wet and dry tests and those processes I desire to ask some questions and I will ask them in connection with the samples hereafter I think that is all with that exception that I have to ask him in regard to. That is all with the exception of matters connected with the samples and the stage of the water

Mr Hart Q You were asked on cross examination in relation to your judgment as to the number of cubic yards that would be washed by a miner's inch. I want to know from you whether or not there are any means by which you can make a mathematical determination approximately at least of the amount of dirt washed by a miners inch?

361 A I know of no means of

calculating mathematically the amount of sediment that water will carry. All such calculations are empirical methods based upon experiments

Q Of course they are based upon experiments? Ayes.

Q But is there or is there not a quantity which you can obtain by experiments which will enable you to calculate the amount

A Basing a calculation upon the results of observed phenomena I think there might be a calculation made. Yes sir

Q Suppose you go to the mouth of a flume and take the amount of debris coming out and the amount of debris carried out of a particular mine by a miner's ditch: Could the experiment would be similar to that which I understand was made by Mr.

Allard namely the taking of a sample of samples of the water flowing from the flume and afterwards determining the amount of water held by them.

Q How by that means could you calculate the amount that a miners inch in that instance was washing at that time without knowing the amount of water used in the mine?

A Supposing the sample to be a fair representation of the whole of 2230 cubic feet of water, yes.

Q Why do you use the figures 2230? A Because I recognize that as about the volume of water of a 24 hour inch

Q A miners inch? A Yes.

Q Which would be a better method to ascertain the head of water and merely inspecting the banks as they stand at [illegible] taking a

pample of the washings as they merge from the flume? A It would be more accurate. That would depend entirely on the qualifications of the observer.

Q Well take the pame of observer? A Well I do not know what his qualifications are in that particular respect

Q You may take a man who is qualified to observe either way. I speak of the method and of course it must be assumed that he is a qualified man

A For instance going there as — am I to refer to Mr Allardt in that particular experiment?

Q You may refer to any body. You can refer to Mr Allardt if you desire

Mr Belcher I desire that you should not refer to Mr Allardt except as to the particular specimen of work there before you in

that tube.

Mr Start I desire that he should refer to Mr Allards as fully as he desires

The Court Which is the more accurate method of the two?

Mr Start Assuming that the person experimenting is perfectly competent to use either? Q Do ascertain the duty which a 24 hour inch is performing at that moment or at that hour, the hour of observation, the method by which this result was obtained <referring to Allans tube> would in my judgment be the more accurate but if you allow me to qualify that I will say that to ascertain the average duty of water in a large work of that kind if the observer were perfectly qualified and familiar with such work and with

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the material being worked the most accurate method would be to make an inspection of the material and to ascertain the conditions of the working of it and then to apply the result of his experience and knowledge of other workings

Q Now would or would not a person make as nearly as possible a perfect estimate or accurate calculation resorting to both methods? A If I were called upon as an expert purposing for the moment that I am one in this matter to determine how much material or what the duty of water was in a mine similar to this Indiana Steel Mine and it were at work and my time was limited I would not only make an inspection of the mine itself and

its workings but I would also take samples of the water

Q You were asked in relation to land slides and you spoke of but one in the basin of the American river. If there had been any considerable land slides along your route would you have seen them?

A If they had been along the route yes

Q This land slide that you spoke of at Michigan bluff did you ascertain any cause for it?

A I did not ascertain any cause for it but I was as I remember, told the cause

Q Do you know whether or not there was any mining under it? Alunder it?

Q Yes or about it affecting it? A No sir, this was a land slide of the natural hill side. It was not a

land slide down into the mine which frequently occurs but a land slide on a hill side

Q On a hill side? A Yes.

Q Where did that slide to? Into the river?

A It slid so that the foot or base of it rested in the Cañon and had formed apparently a dam, a small dam for a little while and the top of it just the toe of it was washed away

Q It was all there except the toe that you speak of?

A I should judge that the great mass of matter was there that had slid down

Q Did you ascertain how long since that land slide had occurred? A My recollection is that I was told that it occurred the previous Winter or within a recent time had been an occurrence that was

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phil talked about

Q Did you see any droves of cattle up there?

A I do not remember to have seen any considerable droves. I might have seen some

Q Will you state the comparative number of grizzly bears and cattle in these cañons where you were. A I cannot I was not hunting for grizzly bears there

Q Did you see any sheep up there? A Not that I remember of

Q If any debris came down here from the effect of sheep it would probably be or would it be such as you could distinguish it? A It would depend on what effect of sheep you refer to

Mr Cadwalader Mr Stull

When you bring Mr Belcher this information I wish you

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would bring us some on the
subject of erosion. On the
law of erosion covering that
country Atwell Stake
that to mean the results
of such observations as
have been made of the
washing from large drainage
areas by rivers draining
them.

Mr Start He means in
these mountains up here

A There is no data refer
ring to these mountains
particularly sir

Mr Cadwalader. It is about
a foot in 5000 years is it
not? A I am unable to
state

Q In such a valley as
the Mississippi?

A I am unable to state
from recollection

Q Will you look at your
tables and produce them
when you bring the other
information that Mr Belcher
asked for? A Yes.

Mr W C Belcher Bring the information also with regard to other rivers

Mr Hart We do not want any information in regard to other rivers.

Mr Belcher Now in regard to this matter of measuring you say that a measurement where you know the area exactly in cubic feet of earth removed and you know the quantity of water used in inches and you have an exact measurement of each do you mean to say that then the conclusion which you arrive at is a matter of guess work, empirical?

A Oh no

Q That is exact is it not?

A That is as exact as you can make it

Q And is not that the only way in which any reasonable approximation can be made? A For the

average of the whole work
Yes.

Q And is it not true that a sensible man would never resort to any other method when he could obtain the data for that?

A I do not profess to be an expert as to sensible men generally

Q I will leave that question without an answer. But is there any other method that would make any decent approximation to that, that is where you have the exact figures, a decent approximation to determine where you have the amount of water used and the amount of water used to move it

Mr Cadwalader Q Suppose the material is not of uniform character?

A Yes there is another method

Q What is it? A The other

method that I have already described that of comparing results in other mines with results in that mine the conditions being considered

Q And these results would be by measurements in the panel way in other mines would they? A The foundation of that knowledge would be measurements in other mines

Q Now would you say that going to the mouth of the flume and taking a specimen of the water from it would be any fair test of the amount of earth that was being removed in a year from that mine a single specimen or 20 specimens?

A Well it might be, it probably would not

Q Would you as an engineer undertake to make any such estimate when

there were any better data at hand to work from?

A I have already stated that I should include both experiments.

Q Has water any effect such as that is in that glass in keeping it up from the bottom?

A If you have a column of water I suppose that is 2 feet or 3 foot deep —

Q (Cut) Will it affect the sediment at the bottom at all when it is allowed to settle like that? Does it settle solid or settle loose? A I have already explained that in the case of distinctively granulated sediment that it will settle pretty solidly but in the case of clay sediments it will not at first and the water has the effect to prevent it from settling solidly at first.

Q You have explained how it will settle in running water. You say that each particle of sand or other material will seek a cavity in which to deposit itself and that it will remain firm? Ayes.

Q So that there will be a solid and firm setting together caused by the force of the running water? Ayes.

Q That would be true there? Ayes.

Q Now if it be allowed to just settle down as it will in something of that sort <referring to glass tube> is the same thing true?

Another great an extent nevertheless with the sands they will settle down to quite a compact form In settling in the water each grain of sand that has already settled has a sharp point sticking up.

and another grain will not rest on top of it but will tumble off in the hole

Q Do sands ever get rounded? A Siliceous sands, no sir, not to any great extent. Looking at them under a microscope they are always angular

Q Take the examples which you have upon that board there, any one of them. We will take first the two at the extreme left. Those now are dry are they? A They are dry

Q Before those were dried did they occupy more or less space up and down than they do dry? A I have never made any such comparison but I observe here—

Q Lucky? Let me ask you—

Mr Hurd Lucky? Let him answer the question

Mr Belcher after a little

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while

Mr Hart I think he has a right to answer the question I insist that he shall be permitted to state

Mr Belcher Q Do you say that you have answered my question or not?

A I had answered it directly but I had not made the explanation that I desired to make

Q Go on and make your explanation A I observe here that these sediments are not thoroughly pulverized nor well settled. They are as they came off of the filtering paper, in scales or little lumps and the occupy here by reason of a mechanical condition, a larger space than they would if they were all thoroughly pulverized and settled

Q Let me ask you then another question which

will lead to the same thing: suppose that you take just what there is in that glass tube there and were to dry it, how much less space would it occupy? Or if you were to take it as it is allowing the water to escape but more of the solid material and press it so that it would come together and have the consistence that it has as it is in the banks from which it was taken, what would be the relative proportion? A There might be a difference of 15 or 20 per cent as I said, I think, in the direct examination.

Q Now do you mean to say that it would not have very much more than 15 or 20 per cent. Have you ever made an experiment by which you might judge accurately of that?

A I never have made any

experiments with a view of judging — with a view of arriving at that result But in making an experiment or observing other phenomena. I have acquired some information that would enable me to estimate it. For instance, where this material called slickens settles or has settled from still water in the deep pools and then is left exposed to the air and the sun afterwards how —

Q <Cut?> Slack?

A To slack and to become dry. I have observed that although it settles down apparently to a compact mass and a horizontal or nearly horizontal surface that whenever it has a chance to dry out big cracks appear in it. It opens out in big cracks

Q What does that necessarily

imply? A Matrix a dry
stake it occupies a less
space than in a wet.

Mr Broadwalader Did I
understand you to say
that a cubic foot of the
bank before mined would
make a cubic foot and a
quarter in the valley?

Mr Belches I do not think
he made that remark
<To Witness> What did
you say with respect to
the relative —

A<int'g> I refer to the
difference between the
results obtained by the
processes by which these
specimens were obtained
and the process by which
this in the tube has been
concentrated and not to
the bank or the material
in the bank at all.

Mr I. S. Belches I under-
stood you to say in answer
to a question that in the
mine in a compact condition

it occupied as much space by 15 or 20 per cent as it does in water? Ans sir I was not talking about that subject at all.

Q You did say something about 15 or 20 per cent.

A That is the difference in the results obtained by the different processes.

Mr W C Belcher How is it not true Mr Hull that the deposition of this very material in the mine was produced in the same way by running water that it is in the bed of our rivers? I ask you if this material was not originally deposited in the mine by water?

<Mr Hart objected to the question on the ground that it is not in cross examination The Court overruled the objection and the Counsel for plaintiff excepted>

A I believe it is a generally accepted theory in

Ex

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which I am a believer that these great gravel deposits were made by the action of running waters in rivers which have gone out of existence

Q Then your answer would be to the question as to the deposition or deposit of the material in this very mine of which we are speaking, the mine of the defendant in Indiana that it was so deposited? A Yes

Q By running water?

A Yes

Mr Badgeley The other theory is the sea theory is it not? A There is a theory that those deposits were made by the action of the ocean along its borders

Mr W C Belcher Who advances or advocates that theory?

Mr Hunt I object to the question on the ground

that it is immaterial

Mr Belches If it material for them to ask it it is material for us to cross examine the Witness upon it

Mr Badwalades I withdraw it then. It makes no difference whether it was deposited by the sea or by rivers

Mr W C Belches If it is withdrawn I do not desire to ask any questions about it.

<Recess until 2 o'clock>

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